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PROCEEDINGS

OF THE

Biological Society of Washington

VOLUME XVI

1903

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OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

For 1903

(ELECTED DECEMBER 27, 1902)

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VOL. XVI, PP. VII-XII. APRIL 18, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS.

The Society meets in the Assembly Hall of the Cosmos Club on alternate Saturdays at 8 P. M. Brief notices of the meetings, with abstracts of the papers, are published in *Science.*

January 10, 1903—364th Meeting.

The President in the chair and 54 persons present.

Walter Evans spoke of a forest reserve which was about to be established in northeastern Porto Rico.

The following communications were presented:

L. O. Howard: Exhibition of Lantern Slides Illustrating Yellow Fever Investigations in Cuba.

S. E. Meek: The Geographic Distribution of the Fresh-water Fishes of Mexico.

O. P. Jenkins: Rate of the Nervous Impulse in Certain Invertebrates.

January 24, 1903—365th Meeting.

The President in the chair and 27 persons present.

William Palmer exhibited specimens of *Camptosorus rhizophyllus*, showing irregularities in the form of the base.

T. D. A. Cockerell recorded three species of fish new to the Territory of New Mexico.

The following communications were presented:

A. D. Hopkins: Work of Forest Insects.

O. F. Cook: An Ordinal Character in the Diplopoda.

O. F. Cook: Evolution, Cytology, and Mendel's Laws.*

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* Pop. Sci. Monthly, LXIII, pp. 219-228, July, 1903,

February 7, 1903—366th Meeting.

The President in the chair and 37 persons present.

The following communications were presented:

Vernon Bailey: The Goodnight Herd of Buffaloes and Cataloes in Texas.*

T. H. Kearney: Further Observations on the Effect upon Seedlings of Sodium and Magnesium.

Frank Bond: Irrigation Methods and Machinery.

February 21, 1903—367th Meeting.

The President in the chair and 34 persons present.

Carleton R. Ball exhibited specimens of 5 species of grasses of the genus *Elymus*, illustrating differences between those grown in open and in shady places.

The following communications were presented:

D. E. Salmon: The Recent Outbreak of the Foot and Mouth Disease in New England.†

H. J. Webber: Egyptian Cotton in the United States.‡

W. E. Safford: The Fauna of the Island of Guam.§

March 7, 1903—368th Meeting.

The President in the chair and 42 persons present.

F. A. Lucas exhibited lantern slides showing the famous fossil-bearing quarries of Solenhofen, Bavaria, and also views of colonies of iguanas on the Galapagos Islands.

The following communications were presented:

F. W. True: Attitudes and Movements of Living Whales.‖

O. F. Cook: Biological Notes from Liberia.

March 21, 1903—369th Meeting.

The President in the chair and 31 persons present.

T. D. A. Cockerell exhibited specimens of cockleburs intermediate between *Xanthium commune* and *Xanthium commune intermedium*.

B. W. Evermann spoke of shad from Pensacola, Florida, found to be identical with the Alabama shad.

The following communications were presented:

T. S. Palmer: The Preservation of Pelican Island as a Breeding Ground for Birds.

Walter H. Evans: The International Catalogue of Scientific Literature.

Vernon Bailey: Desert Life of Western Texas.

Paul Bartsch: Notes on the Herons of the District of Columbia.¶

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* Forest and Stream, LX, p. 325, Apr. 25, 1903.

† 19th Ann. Rept. Bur. Anim. Industry, U. S. Dept. Agric., pp. 391–408, 1903.

‡ Trans. New Eng. Cotton Manuf. Assoc., No. 74, pp. 202–216, 1903; Proc. 7th Ann. Conven. So. Cotton Spinners' Assoc., pp. 127–141, 1903.

§ Birds of the Marianne Ids., The Osprey, N. S., I, pp. 39–42, March, 1902; pp. 65–70, April, 1902.

‖ Smithsonian Misc. Col., XLV (quarterly issue), pp. 91–94, pls. XXIV–XXVI, Dec. 9, 1903.

¶ Smithsonian Misc. Col., XLV (quarterly issue), pp. 104–111, Dec. 9, 1903.

April 4, 1903—370th Meeting.

Vice-President Ashmead in the chair and 39 persons present.

The following communications were presented:

H. J. Webber: Bud Sports and Bud Variation in Breeding.

R. H. True: The Manufacture of Tea in America.

W. C. Kendall: The Fishes of the Rangely Lakes.

April 18, 1903—371st Meeting.

The President in the chair and 25 persons present.

The following communications were presented:

W. J. Spillman: Agrostological Problems in the United States.

B. H. Dutcher: The Mammals of Mount Katahdin, Maine.*

V. K. Chesnut: Notes on the Dissemination of *Sedum douglassi* by Proliferous Shoots.

May 2, 1903—372nd Meeting.

Vice-President Hay in the chair and 25 persons present.

The following communications were presented:

F. V. Coville: Wocas: An Aboriginal Cereal (*Nymphaea polysepala*).†

J. W. T. Duvel: Vitality of Seeds. ‡

G. H. Shull: Geographic Distribution of the Sugary Quillwort (*Isoetes saccharata*). §

May 16, 1903—373rd Meeting.

The President in the chair and 30 persons present.

F. V. Coville exhibited a monstrous specimen of the grape-hyacinth.

Frank Baker announced that the collection at the National Zoological Park had recently been increased by three specimens of the echidna and by the birth of a tapir.

The following communications were presented:

C. W. Stiles: The New American Hook-worm and its Medical Importance.‖

F. V. Coville: Location of the Desert Botanical Laboratory of the Carnegie Institution.¶

October 17, 1903—374th Meeting.

The President in the chair and 17 persons present.

L. O. Howard spoke of the length of silk in single cocoons of the silkworm, stating that in 15 cocoons actually measured the length varied from 880 to 1,102 yards.

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* Proc. Biol. Soc. Wash., XVI, pp. 63-72, May 29, 1903.

† Ann. Rept. U. S. Nat. Museum for 1902, pp. 725-739, March, 1904.

‡ To be published as a bulletin of the Bureau of Plant Industry, U. S. Dept. of Agriculture.

§ Botanical Gazette, XXXVI, pp. 187-202, Sept., 1903.

‖ Bull. No. 10, Hyg. Lab., U. S. Pub. Health and Marine Hosp. Serv., pp. 1-121, fig. 1-86, 1903.

¶ Carnegie Inst., Wash., Pub. No. 6, 1903.

The following communications were presented:

T. S. Palmer: Indexing Scientific Names, with Special Reference to the Genera of Mammals.*

O. F. Cook: Central American Mutations of Coffee.

W. P. Hay: Terrapin Culture in the United States.

October 31, 1903—375th Meeting.

The President in the chair and 37 persons present.

Walter Evans exhibited a copy of a circular of directions for the destruction of mosquitoes to be distributed in the Hawaiian Islands and printed in all the languages commonly used there.

L. O. Howard stated that the larvae of *Anthrenus varians* of the family Dermestidae, had been observed to prey upon the eggs of the tussock moth.

The following communications were presented:

R. P. Currie: A Recent Entomological Expedition to British Columbia.

M. A. Carleton: Geographic Distribution of the Oat Plant.

Ch. Wardell Stiles: The Dwarf Tapeworm (*Hymenolepis nana*), a Newly Recognized and Rather Common Parasite of Man in the United States.†

November 14, 1903—376th Meeting.

The President in the chair and 41 persons present.

Lester F. Ward spoke of the description, in 1840, by C. G. Ehrenberg, of 14 hypothetical species of Diatomaceæ, 10 of which were afterward actually discovered and recognized.

W. H. Dall discussed the existence of a dorsal keel toward the tail in porpoises.

G. K. Gilbert exhibited photographs showing a remarkable development of heliotropism in the trunks of *Pinus balfouriana* in California.

The following communications were presented:

Lester F. Ward: The Dresden Cycad (*Cycadeoidea reichenbachiana*).

F. A. Lucas: The Making of a Whale.

November 28, 1903—377th Meeting.

The President in the chair and 37 persons present.

The following communications were presented:

H. F. Moore: The Artificial Fattening of Oysters.

F. H. Hillman: The Comparative Effects of the Seed Midge and of *Brucophagus funebris* on the Structure of Clover Fowers and Fruits.

Charles Hallock: Sea Trout Where No Rivers Are.

O. F. Cook: The Vegetative Vigor of Hybrids and Mutations.

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* Index Generum Mammalium, N. Am. Fauna, No. 23, pp. 1–984, Feb., 1904.

† N. Y. Med. Journ. and Phila. Med. Journ. (consolidated) (1301), Vol. 78 (19), pp. 877–881, figs. 1–5, Nov. 7, 1903.

December 12, 1903—378th Meeting.

The President in the chair and 31 persons present.

L. A. Fuertes exhibited a painting showing the life colors of the soft parts of the California condor and another showing a hybrid between two genera of quail, *Lophortyx* and *Oreortyx.*

H. E. Van Deman exhibited specimens of the "Grimes Golden" apple.

The following communications were presented:

W. H. Ashmead: Remarks on Japanese Hymenoptera.

V. K. Chesnut and Harry T. Marshall: Some Observations on "Locoed" Sheep.

Charles Hallock: The Bison as a Factor in the Distribution of Aboriginal Population in Mid-Continental America.

VOL. XVI, PP. 1-2 FEBRUARY 21, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SAUROPOD DINOSAUR FROM THE JURASSIC OF COLORADO.

BY J. B. HATCHER.

The remains upon which this paper is based were discovered and collected by Mr. W. H. Utterback in the lower Jurassic, in the quarry long worked by the late Professor Marsh, and situated some eight miles north of Canyon City, Colorado.

Haplocanthus priscus, gen. et sp. nov.

The type (No. 572, Carnegie Museum Collection) of this genus and species consists of the two posterior cervicals, ten dorsals, five sacrals with the ilia, ischia and pubes and the nineteen anterior caudals, two chevrons, a nearly complete series of ribs, and a femur, all in an excellent state of preservation.

The present genus and species can be distinguished from the known genera and species of the *Dinosauria* by the following characters: *Neural spines of posterior cervicals and anterior dorsals absolutely simple instead of deeply bifurcated as in all other known genera of the Sauropoda.* Sacrum composed of five vertebrae firmly coössified by their centra and functioning as sacrals. Sacral ribs and diapophyses greatly expanded transversely so as to appear proportionally low and broad. Neural spines of sacrals very short, only moderately expanded transversely, the three anterior coössified forming a long bony plate. Pubes massive and united by an extended cartilaginous pubic symphysis which is interrupted medially by an elongated foramen. Pubic foramen large and situated some distance from the supero-internal border of the bone. Neural arches in dorsal vertebrae extremely high as compared with depth of centra or height of neural spines. Cervicals strongly opisthocœlus, and dorsals only moderately so and becoming almost platycœlus in the posterior dorsal region. Transverse processes of dorsal vertebrae extending obliquely upward and outward from summits of neural arches. Caudal centra short and somewhat amphicœlous with neural spines simple, low, and much compressed. Transverse processes of caudals each consisting of a simple, slender process which in the anterior caudal springs from the side of the neural arch. Posteriorly the transverse processes rapidly decrease in size and assume a more inferior position, so that in the twelfth caudal they are reduced to a rounded knob of bone on the side of the centrum, and in the succeeding caudals they have disappeared altogether. The centra of the anterior caudals are subcircular in outline, but in the posterior caudals the vertical diameter much exceeds the transverse.

The femur is rather longer than one might expect, considering the size and proportions of the individual vertebrae, but does not differ materially from that bone in other genera of the *Sauropoda.*

Haplocanthus may be regarded as the most generalized member of the *Sauropoda* yet discovered in America. That it is a member of the *Sauropoda* is clearly shown by the structure of the pelvis and by the characters exhibited by the cervical, dorsal and caudal vertebrae. The comparatively simple structure of the individual vertebrae from the various regions of the spinal column form a striking contrast to that complicated system of laminae and buttresses found in the vertebrae of *Diplodocus*, *Brontosaurus*, *Morosaurus*, and other *Sauropods*, and indicates that *Haplocanthus* was a more primitive form than any of the latter genera. Its affinities are clearly with the *Morosauridæ* and in size it is comparable with the smaller forms of *Morosaurus.* Its principal skeletal features will be fully described and illustrated in a forthcoming Memoir of the Carnegie Museum.

VOL. XVI, PP. 3-4 FEBRUARY 21, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTION OF A NEW SPECIES OF GECKO FROM COCOS ISLAND.

BY LEONHARD STEJNEGER.

[By permission of the Secretary of the Smithsonian Institution.]

Professor P. Biolley, naturalist of the Museo Nacional, San José, Costa Rica, visited Cocos Island, off the western coast of Costa Rica, in 1902, and has sent me specimens of two species of lizards for identification. One is the *Anolis townsendi* described by me recently (Bull. Mus. Comp. Zool., XXXVI, No. 6, p. 163, Nov., 1900) from the same island. The other is a new gecko of the genus *Sphærodactylus* which has its center of distribution in the West Indies but of which several species are also known from Central America and northern South America.

Sphærodactylus pacificus, sp. nov.

Diagnosis.—Dorsal scales very small, juxtaposed, keeled; ear-opening same size as digital disc; large supranasals separated by two scales, a third median scale anterior to them in the posterior cleft of rostral; scales on top of head keeled.

Type.—U. S. National Museum, No. 31057; Cocos Island; Prof. Biolley, collector.

Habitat.—Cocos Island, Pacific Ocean off the west coast of Costa Rica.

Description of type specimen.—Adult; U. S. Nat. Mus., No. 31057.

Snout moderately pointed, longer than the distance between the eye and the ear-opening, about once and two-thirds the diameter of the eye; ear-opening small, not larger than the discs of the fingers, pear-shaped, horizontal; rostral moderately large with a cleft in the posterior margin, in which is a small median scale; nostril between rostral, first supralabial, a rather large supranasal, and a small postnasal; supranasals separated by two flat hexagonal scales on a line behind the rostral and the small median scale; four large supralabials to below the center of the eye, followed by two small ones, first very long; three large lower labials corresponding to the four large supralabials, followed by two smaller ones, first being as long as the first two supralabials combined; mental large, truncate posteriorly; behind the mental and adjoining the lower labials, large flat scales decreasing in size posteriorly and passing gradually into the granules of the throat; upper surfaces covered with small juxtaposed, granular scales slightly smaller than those on the flanks and keeled, those on the occiput being exceedingly small; the scales on the frontal region somewhat elongate, those on the snout considerably larger, irregularly polygonal, flat but distinctly keeled; a pointed horn-like scale on the superciliary edge a little anterior to the center of the eye; ventral scales rather large, imbricate; tail cylindrical, tapering, covered above with irregular flat scales somewhat smaller than the ventrals, with scarcely any indication of verticels; tail below with a median series of dilated shields except at base which is covered by large flat imbricate scales.

Color (in alcohol) brownish; a pale band extending from the nostril through the upper part of the eye and backwards along the side of the neck communicating with that of the other side in two places across the upper neck; this band can be traced as a very irregular series of pale marblings along the sides of the body; a fairly well-defined dusky band borders this pale one below and across the upper neck, and is in turn bordered below by a pale line on the temples; top of head with ill-defined longitudinal pale marblings the continuation of which may be traced as an irregular pale median dorsal band; tail similarly colored; underside pale, indistinctly mottled with darker brownish.

Dimensions (in millimeters).—Type: total length, 82; snout to ear-opening, 11; width of head, 6.5; snout to vent, 47; vent to tip of tail, 35; fore limb, 14; hind limb, 18.

Variation.—The four additional specimens sent (U. S. N. M. 31058-61) agree in structural characters very well with the above, except that in none of them is the underside of the tail covered with enlarged cross plates. In No. 31061 the tail is also somewhat longer than the distance from snout to vent. The coloration is also essentially alike, except that in 31059 the longitudinal bands are better defined and more regular, especially on the posterior portion of the body; the underside in all is uniformly pale.

Remarks.—This species seems to be most nearly related to *Sphærodactylus lineolatus* from Central America, from which it differs, among other things, in having the upper head scales keeled.

VOL. XVI, PP. 5-8 FEBRUARY 21, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

REVIEW OF THE CLASSIFICATION OF THE CYRENACEA.

BY WILLIAM H. DALL.

In working over the Cyrenacea for the Memoir on the Tertiary Fossils of Florida, in course of publication by the Wagner Institute of Science, it was found that both the nomenclature and the classification were in a state of deplorable confusion. While the details are reserved for that memoir, it was thought that a synopsis of the arrangement adopted might be of use to the students of the group, and it is herewith presented.

Family **Cyrenidæ.**

Genus *Miodontopsis* Dall (nov.). Type *Cyrena media* Sowerby. Jurassic. This is *Miodon* Sandberger, 1870, not Carpenter, 1865.

Genus *Loxoptychodon* Sandberger, 1872. Type *Cyrena intermedia* Deshayes. Lower Eocene, France.

Genus *Plesiastarte* Fisher, 1887. Type *P. crenulata* Deshayes (as *Cyrena*). Lower Eocene, France.

This is *Anomala* Cossmann, 1886, not Hübner, 1816.

Genus *Ditypodon* Sandberger, 1872. Type *Cyrena suessii* C. Mayer. Lower Pliocene of Italy.

?Genus *Donacopsis* Sandberger, 1872. Type *Cyrena acutangularis* Deshayes. Eocene of France. I suspect this to be merely a subdivision of *Cyrena.*

Genus *Cyrena* Lamarck, 1818. Type *Cyrena bengalensis* Lamarck. Recent. India.

Section *Polymesoda* Rafinesque, 1820. Type *Cyclas caroliniana* Bosc. Recent. South Carolina. *Cyprinella* and *Diodus* Gabb, and *Leptosiphon* Fischer are synonymous.

Section *Pseudocyrena* Bourguignat, 1854. Type *Cyrena maritima* D'Orbigny. Cuba. *Anomala* Deshayes, not Hübner, *Egeta* H. and A. Adams, and *Cyrenocapsa* Fisher are synonymous.

Section *Geloina* Gray, 1844. Type *Cyrena coaxans* Gmelin (*C. zeylanica* Lamarck). Recent. Ceylon.

Section *Egetaria* Mörch, 1861. Type *E. pullastra* Mörch. West coast Central America.

Section *Isodoma* Deshayes, 1858. Type *I. cyprinoides* Deshayes. Eocene of France.

Subgenus *Leptesthes* Meek, 1872. Type *Corbicula fracta* Meek. Eocene of Nebraska

Genus *Corbicula* Megerle, 1811. Type *Tellina fluminalis* Müller. India.

Section *Veloritina* Meek, 1871. Type *Corbicula durkeei* Meek. Cretaceous of Wyoming.

Section *Corbiculina* Dall (nov.). Type *Corbicula angasi* Prime. Australia. Smaller and more delicate than *Corbicula* s. s. and viviparous.

Section *Tellinocyclas* Dall (nov.). Type *Cyrena tellinella* Deshayes Parisian Eocene. Small, heavy, elongate and acute, with short distant lateral teeth.

Section *Cyrenodonax* Dall (nov.). Type *C. formosana* Dall. Recent. Formosa. Like *Donacopsis* but inflated, without radial sulcation and having an entire pallial line.

Subgenus *Cyanocyclas* Ferussac, 1818 (restricted). Type *Corbicula limosa* Maton. South America.

Genus *Villorita* Gray, 1833. Type *V. cyprinoides* Wood. Indo China and Japan. The name was spelled *Velorita* by Gray in 1842.

Genus *Batissa* Gray, 1853. Type *B. tenebrosa* Hinds. Australia.

Genus *Egeria* Roissy, 1805. Type *Venus paradoxa* Born. Rivers of West Africa. *Galatea* Bruguiere, *Trigona* Schumacher not Jurine, *Potamophila* Sowerby, *Galateola* Fleming, and *Megadesma* Bowdich are synonymous.

Section *Egeria* s. s. Type *E. paradoxa* Born.

Section *Profischeria* Dall (nov.). Type *Fischeria Delesserti* Bernardi. West Africa. This is *Fischeria* Bernardi, 1860, not Robineau Desvoidy, 1830.

Family **Sphæriidæ.**

Genus *Sphærium* Scopoli, 1777. Type *Tellina cornea* Linné. North Europe. *Cyclas* Lamarck not Link, *Cornea* Megerle, *Amesoda* Rafinesque, *Cycladites* Krüger, *Pisum* Bourguignat not Megerle, and *Corneola* Clessin, not Held, are synonymous.

Subgenus *Sphærium* s. s. Type *S. corneum* Linné.

Section *Cyrenastrum* Bourguignat, 1854. Type *S. solidum* Normand. France.

Section *Sphæriastrum* Bourguignat, 1854. Type *S. rivicola* Leach. England.

Subgenus *Musculium* Link, 1807. Type *Tellina lacustris* Müller. Denmark. *Calyculina* Clessin is synonymous.

Subgenus *Eupera* Bourguignat, 1854. Type *Pisidium moquinianum* Bourg. Brazil. *Limosina* Clessin is synonymous.

Genus *Corneocyclas* Ferussac, 1818, (restricted). Type *Tellina pusilla* Gmelin. Germany.

Subgenus *Corneocyclas.*

Section *Corneocylas* s. s. Type *C. pusilla* Gmelin.

Section *Phymesoda* Rafinesque, 1820. Type *Tellina virginica* Gmelin. Virginia.

Section *Pisidium* C. Pfeiffer, 1821. Type *Tellina amnica* Müller. Denmark.

Section *Cyclocalyx* Dall (nov.). Type *Pisidium scholtzii* Clessin. Germany. The umbones high and constricted below the nepionic shell, otherwise like *Corneocyclas* s. s.

Subgenus *Cymatocyclas* Dall (nov.). Type *Pisidium compressum* Prime. Cambridge, Mass. Nepionic valves flat, transversely undulated, sharply marked off from the rest of the disk, otherwise as in *Corneocyclas.*

Subgenus *Tropidocyclas* Dall (nov.). Type *Pisidium henslowianum* Sheppard. England. Nepionic valves with an oblique, elevated, radial keel and distinctly delimited from the rest of the disk. *Fossarina* Clessin, 1873, not Adams, 1863, is synonymous.

Notes.

Pera Leach and *Euglesa* Leach, 1852, are synonymous with *Corneocyclas* s. s. *Galileja* Costa; *Euglesia* Leach, 1840; *Pisum* Gray, 1847, not Megerle, 1811; *Cordula* Leach; *Fluminina* Clessin; *Cycladina* Clessin; and *Rivulina* Clessin; are not separable from *Pisidium* s. s., if judged by their types; most of them are based on perfectly worthless characters. The specific determinations of Westerlund in the 'Fauna der Palæarctischen Region' have been accepted in determining the synonymy of the types.

It may be of interest to state here that the group *Cyclas*, a name applied by Bruguiere, in 1798, to a heterogeneous assembly, and afterward used by Lamarck for species of the prior genus *Sphærium*, was first properly divided by Link in 1807, who segregated *Musculium* and took the largest and first species of Bruguiere as a type for the genus *Cyclas*. This was the *Venus islandica* of Linné, to which, subsequently, the names of *Cyprina* Lamarck, 1812; *Arctica* Schumacher, 1817, not Moehring, 1758; and *Cypriniadea* Rovereto, 1900, were applied. These become synonyms of *Cyclas* (Bruguiere) Link, whose only species and type is *Venus islandica* L.

VOL. XVI, PP. 9-10 FEBRUARY 21, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW COCKLEBUR FROM NEW MEXICO.

BY T. D. A. COCKERELL.

My work on the plants of the region about Las Vegas has brought to light the interesting form of *Xanthium commune* Britton, described below. The first specimens collected were referred to Prof. E. O. Wooton, who was then working at Columbia University. He found that nothing of the kind was represented in the Columbia herbarium and concluded that the species was new. Upon his return to New Mexico I urged him to publish it, but he delayed, and after a couple of years we both became doubtful of the validity of the species, observing that nothing but the burs would separate it from *X. commune* (then called by us *X. canadense*). Later our doubts were confirmed when I found at Las Vegas a pair of burs, one of each kind, growing on the same twig. This specimen is now in the herbarium of the Agricultural College at Mesilla Park. Among hundreds of plants since observed, I have not seen another like it, nor have I seen a plant which could not at once be referred to one or the other form.

Xanthium commune wootoni, sp. nov.

Similar in all respects to *X. commune* Britton, but the burs more slender (greatest transverse diameter about 6 mm., beaks and prickles about

5½ mm.), and the prickles much less numerous (about 25 to the bur) and mostly stouter basally. Collected by the writer at Española, N. M. and Las Vegas, N. M. It occurs abundantly, always growing with *X. commune*.

Specimens of *X. c. wootoni* have been sent to Prof. E. L. Green and to Dr. P. A. Rydberg. The former said it was unknown to him, the latter considered it a new species.

It is, in fact, a species in the De Vriesian sense, of more than ordinary interest.

Las Vegas specimens sent to the U. S. National Herbarium may be regarded as the types (No. 404186). Other specimens showing leaves and flowers as well as burs, are in the Herbarium of the New York Botanical Garden and the Herbarium of the New Mexico Agricultural College.

VOL. XVI, PP. 11-12 FEBRUARY 21, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW NAME FOR THE HAWAIIAN BIRD GENUS OREOMYZA.

BY LEONHARD STEJNEGER.

In 1887 I established the genus *Oreomyza* for a Hawaiian bird then described for the first time, viz. *Oreomyza bairdi.* It now appears that in the same year Pokorny gave the identical name to a genus of Tipulid insects. Fortunately it is possible to settle beyond a doubt the question which of the two has priority, since Pokorny's name was published on February 28 and mine not until July 2, thus:

Oreomyza Pokorny, Wiener Entomol. Zeitung, 1887, Feb. 28, p. 50.

Oreomyza Stejneger, Proc. U. S. Nat. Mus., 1887, July 2, p. 98.

The latter, therefore, must give way, and in order to cause as little change as possible I propose to substitute the word

Oreomystis

for the bird genus. The following species are now included in this genus:

1. *Oreomystis bairdi* Stejneger (type).
2. *Oreomystis mana* (Wilson).
3. *Oreomystis perkinsi* (Rothschild).
4. *Oreomystis flammea* (Wilson).
5. *Oreomystis newtoni* (Rothschild).
6. *Oreomystis maculata* (Cabanis).
7. *Oreomystis montana* (Wilson).

VOL. XVI, PP. 13-14 FEBRUARY 21, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTION OF A NEW QUAIL-DOVE FROM THE WEST INDIES.

BY J. H. RILEY.

[By permission of the Secretary of the Smithsonian Institution.]

While examining some doves labeled *Geotrygon mystacea* I was struck by the variations exhibited by specimens from the different parts of its range. My material has not been sufficient to work these out satisfactorily, but the following species is so very distinct that I take this opportunity of describing it.

My thanks are due to Dr. J. A. Allen, of the American Museum of Natural History, Mr. Charles B. Cory, of the Field Columbian Museum, and to Mr. Outram Bangs, of the Museum of Comparative Zoology, for the loan of specimens.

Geotrygon sabæ, sp. nov.

Type.—Adult female, No. 80,982, U. S. National Museum, Saba Island, W. I., collected by F. A. Ober.

Characters.—Differs from *Geotrygon mystacea* in being darker above, in having the breast light hazel passing into vinaceous-rufous (vinaceous-cinnamon in *mystacea*), the belly cinnamon-rufous, the lining of the wings darker, and the tail darker and more strongly edged with a darker shade of brown.

Measurements.—Wing, 170; tail, 89; exposed culmen, 21 mm.

Remarks.—Schlegel (Mus. Pays-Bas, Columbæ, 1873, 164) gives the type of Temminck's *Columba mystacea* as coming from the Island of Hayti. I know of no recent record of the bird from that island. Temminck's plate represents a bird without the dark rictal stripe and with lighter underparts than any specimen I have been able to examine. The U. S. National Museum possesses a specimen from Culebra Island (reported from here for the first time) that comes nearer the plate of *mystacea* than any other specimen in the series before me. I take it to represent true *mystacea* and have compared the Saba bird with it. The type of *sabæ*, though a female, is so very different from any of the other specimens before me that I am unable to explain these differences on account of sex. The dark color of the breast serves to distinguish it at a glance from *mystacea*.

VOL. XVI, PP. 15-16 FEBRUARY 21, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW CLIFF SWALLOW FROM TEXAS.

BY HARRY C. OBERHOLSER.

Mr. Ridgway has called my attention to certain differences characterizing the cliff swallow of southwestern Texas, which differences seem to warrant its subspecific separation. It may therefore be known as

Petrochelidon lunifrons tachina, subsp. nov.

Chars. subsp.—Similar to *Petrochelidon lunifrons lunifrons*, but decidedly smaller, the forehead ochraceous instead of cream color.

Description.—Type, adult male, No. 168,271, U. S. N. M., Biological Survey Collection; Langtry, Texas, April 26, 1901; H. C. Oberholser. Upper surface dark steel green, the forehead ochraceous, the rump rufous, the hind neck with a narrow collar of light brownish gray, succeeded anteriorly by an imperfect one of chestnut; wings and tail fuscous, with a greenish gloss, the innermost secondaries (tertials) and primary coverts with margins of pale grayish; chin, cheeks, and auriculars, continuous with the collar, chestnut; center of throat steel green; breast, and sides of throat and neck behind the chestnut, dull light brownish, the first with a strong ochraceous tinge; remainder of ventral surface white, with the sides and lower tail-coverts pale fuscous, the anal region ochraceous.

Length of wing (type), 104 mm.; tail, 45 mm.; exposed culmen, 7 mm.; tarsus, 11.5 mm.

Although seemingly most like true *P. lunifrons*, the bird above described is intermediate between *lunifrons* and *melanogastra*, approaching in size very close to the latter. In respect to the color of the forehead, as well, its aberration from *lunifrons* is in the direction of *melanogastra*, with which also it may be found to intergrade. After due allowance has been made for individual variation which, however, does not exist to an unusual degree, the characters exhibited by this new race seem to be very constant, at least in the considerable series available for examination.

Apparently all the breeding cliff swallows of southwestern Texas ought to be referred to *tachina*, the range of which extends thence into eastern Mexico as far at least as Vera Cruz.

The following average measurements of the three forms of *Petrochelidon* here concerned have been kindly furnished by Mr. Ridgway. They relate to males, and are in millimeters.

No. of Specimens	Name	Wing	Tail	Exposed Culmen	Tarsus	Middle Toe
17	*Petrochelidon lunifrons lunifrons*	108.6	49.4	7.2	12.6	12.2
7	*Petrochelidon lunifrons tachina*	102.1	45.3	7.6	12.1	12.1
8	*Petrochelidon melanogastra*	103.	46.4	6.8	12.	11.

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VOL. XVI, PP. 17-18 FEBRUARY 21, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTION OF A NEW VIREO.

BY HARRY C. OBERHOLSER.

The vireos of the *bellii* type from southwestern Texas, though in certain respects intermediate between *Vireo bellii bellii* and *Vireo bellii pusillus* seem to be sufficiently distinct from either to require a name. In view of this they may be called

Vireo bellii medius, subsp. nov.

Chars. subsp.—Similar to *Vireo bellii bellii*, but paler, more grayish above; paler and much less extensively yellow below.

Geographical distribution.—Southwestern Texas, and immediately adjacent portion of Mexico.

Description.—Type, adult male, No. 168275, U. S. N. M., Biological Survey Collection; Boquillas, Texas, May 24, 1901; H. C. Oberholser. Head and nape brownish gray; back and scapulars dull grayish olive green, the rump rather brighter; wings and tail fuscous, margined exteriorly with olive, the former crossed by two distinct dull white bars; lores grayish white; sides of head and neck pale brownish gray; underparts white, washed with yellowish across the breast; flanks and sides of body pale olive yellow; under tail-coverts yellowish.

The differences between this race and true *bellii* are most evident in the much more grayish head, the decidedly darker back, and in the restriction of the yellow of the flanks and sides—the middle of abdomen and breast being almost pure white. In size there appears to be no material difference. From *Vireo bellii pusillus* it may be distinguished by its darker, less uniform upper surface, the back being distinctly olive green in contrast to the head and nape; the much more yellowish flanks and sides; the rather less purely white under surface; and the decidedly shorter tail.

Specimens to the westward in the range of *Vireo bellii medius* indicate intergradation with *pusillus*, and taken in connection with hardly typical examples of the latter from extreme western Texas, show pretty conclusively that to *pusillus* there belongs a trimomial name.

Average millimeter measurements of five specimens of each of these three forms are as follows:

Vireo bellii bellii (Kansas and Illinois): wing, 55.6; tail, 45.8; exposed culmen, 10; tarsus, 18.5; middle toe, 9.8.

Vireo bellii medius (Texas): wing, 54.1; tail, 46.3; exposed culmen, 9.7; tarsus, 18.5; middle toe, 9.4.

Vireo bellii pusillus (California): wing, 54.6; tail, 49.6; exposed culmen, 9.3; tarsus, 18.9; middle toe, 9.9.

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VOL. XVI, PP. 19-24 MARCH 19, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

PSILOSTROPHE, A NEGLECTED GENUS OF SOUTHWESTERN PLANTS.

BY AVEN NELSON.

The collections of Mr. Leslie N. Goodding, a student in the University of Wyoming, made in southern Utah and Nevada in the spring of 1902, are bringing to light some exceedingly interesting xerophytic plants. Among these is a shrubby *Psilostrophe* (*Riddellia*), the study of which led to an investigation of the whole genus.

The species formerly recognized are only three and one variety, and in spite of the remarkably heterogeneous mass of material found in the genus, the three names have been made to do duty for all that have been collected. The material found in the Rocky Mountain herbarium seemed to indicate some novelties, but to confirm these, Dr. J. N. Rose, Assistant Curator, U. S. National Herbarium, made it possible for me to examine the much larger series of specimens in that collection. For this favor I wish here to express my hearty thanks.

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Key to the species of Psilostrophe.

Pubescence of the stem white and densely pannose. - 1. *P. Cooperi.*
Pubescence of the stem villous or loosely floccose-lanate.
  Akenes and pappus arachnoid-villous. - - 2. *P. gnaphalodes.*
  Akenes and pappus glabrous.
    Pappus scales lanceolate, acute.
      Floral structures ceriferous; rays small.
        Moderately lanate; perennial - - 3. *P. cerifera.*
        Inordinately lanate; biennial - 3a. *P. cerifera biennis.*
      Floral structures free from wax; rays large.
        Fastigiately branched - - - 4. *P. tagetina.*
        Simple stemmed - - - 4a. *P. tagetina lanata.*
    Pappus scales oval, obtuse, denticulate. - - 5. *P. pumila.*
Pubescence of stem scanty, softly hirsute. - - 6. *P. sparsiflora.*

1. **Psilostrophe Cooperi** (Gray) Greene.

Riddellia Cooperi Gray, Proc. Am. Acad. 7:358. 1868.
Psilostrophe Cooperi (Gray) Greene, Pitt. 2:176. 1891.

This species needs further study. The series of specimens examined shows much variation and yet not one that tallies closely with the original description. I rather suspect, however, that the original specimens by Cooper were undersized and not typical of the species as now represented; that the description should be expanded to take in more truly shrubby forms, with leaves 4–7 cm. long, larger rays often 5 in number and with more numerous disk corollas (12–20). The pappus seems often to be of nearly entire lanceolate scales and the peduncles are far from filiform. Such amplified characters would take in all of the following, though the description as drawn by Dr. Gray excludes at least the first half of the series that follows:

L. N. Goodding, No. 752, Bunkervill, Nevada, 1902; M. E. Jones, No. 3891, Yucca, Arizona, 1884; Dr. Smart, No. 278, Arizona, 1867; J. W. Toumey, No. 6396, Tucson, Arizona, 1892; W. F. Parish, Lowell, Arizona, 1884; Coville and Funston, No. 292, Pahrump Valley, Nevada, 1891; Dr. Palmer, No. 246, S. Utah, 1887; T. S. Brandegee, Arizona, 1892; Lt. Wheeler, Nevada, 1872; Dr. Palmer, Arizona, 1869; J. W. Toumey, No. 639c, Castle Creek, Arizona, 1892; C. A. Purpus, No. 6125, Pahrump Valley, Nevada, 1898; Dr. Vasey, Tucson, Arizona, 1886.

2. **Psilostrophe gnaphalodes DC.**

Psilostrophe gnaphalodes DC. Prod. 7:261.1838.
Riddellia arachnoidea Gray, Pl. Fendl. 94. 1849.

This species is fairly uniform, though species so ticketed in the herbaria are often something else. As observed by Dr. Gray, the foliage is not essentially different from *P. tagetina*. One might suspect that some distributors believe the specific name refers to the pubescence of the leaves. It seems to be confined to Texas and adjacent Mexico.

Chas. Wright, No. 380, Western Texas, 1849; C. G. Pringle, No. 9040, Jaral, Mexico, 1900; F. S. and E. S. Earle, No. 446, Devil River, Texas, 1900; Mex. Bound. Surv., No. 628; L. H. Dewey, College Station, Texas, 1891; V. Havard, No. 45, Stockton, Texas, 1881; M. E. Jones, No. 3718, El Paso, Texas, 1884.

3. **Psilostrophe cerifera,** n. sp.*

Stems few to several from the enlarged crown of a ligneous taproot, or more rarely the crown raised on a short simple caudex; the stems simple or sparingly branched, 1–2 dm. long, floccose-tomentose; leaves lightly lanate, entire, lanceolate-spatulate, obtuse or acute at apex, the tapering base scarcely petioled; inflorescence corymbose, the rather small heads congested on the tips of the branches of the corymb; bracts of the narrow involucre broadly linear, in one series, rigid and closely connivent, the waxy or resinous particles with which they are sprinkled obscured by the lanate pubescence but extending to all parts of the flowers, the akenes, and even to the leaves of the plant; rays usually 3, the ligule 3–4 mm. long and nearly twice as broad, its slender tube equalling the ligule and almost equalled by the linear pappus-scales; disk flowers 10 or fewer, slightly articulately enlarged at the summit of the tube proper; akenes glabrous, not striate, somewhat 4-angled; pappus linear, nearly as long as the disk corollas.

The type is Mr. M. A. Carleton's No. 201 (in Ry. Mt. Herb.), from the Cheyenne Country, Indian Territory, June 1891; distributed by the U. S. National Herbarium. Wholly typical are Mr. Paul J. White's specimens, Woods County, Oklahoma, June 29, 1900. Mr. Hitchcock's No. 741, from the Gypsum hills of Barker County, Kansas, is undoubtedly the same, though, on account of age, the leaves are largely wanting. A specimen by Prof. Kellerman, from Kansas, 1888, is more floccose woolly and has the appearance of being merely biennial, and this may be true of Mr. Hitchcock's specimens (the number cited) also.

A very abnormal form is found in Mr. B. B. Smyth's specimens; No. 140, from Crooked Creek, Meade County, Kansas, which tends to confirm the suspicion that in more northern localities this species is altogether biennial. These may be designated:

3a. **Psilostrophe cerifera biennis,** n var.

Larger than the species, mostly single-stemmed from the crown, often freely and intricately branched above, densely and permanently floccose

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*A paratype of *Psilostrophe cerifera* A. Nelson is in the National Herbrium under the herbarium number 26,577.

throughout; crown leaves and lower stem leaves wanting at the time of flowering.

Type of the variety, as cited above, in the National Herbarium (No. 26,577).

4. **Psilostrophe tagetina** (Nutt.) Greene.

Riddellia tagetina Nutt. Trans. Am. Phil. Soc., 7:361. 1841. Gray, Syn. Fl., 317, probably in part only.

Psilostrophe tagetina (Nutt.) Greene Pitt., 2:176. 1891.

Even after segregating the species indicated as new in this paper the specimens at hand show considerable variation and may still be an aggregate, but to the writer the difference seems to be vegetative and not congenital. Judging by the specimens the center of distribution is New Mexico.

Specimens examined.—New Mexico: E. O. Wooton, 1894; id, No. 6, 1897; F. S. and E. S. Earle, No. 374, 1900; A. A. and E. G. Heller, No. 3739, 1897; J. G. Smith, No. 25, 1897; G. R. Vasey, 1881; A. Fendler, No. 461, 1847; J. T. Rothrock, No. 463, 1874. Arizona: Walter Hough, No. 115, 1896; Comanche Plains, J. M. Bigelow, 1853.

Somewhat aberrant and mostly distributed as *Riddellia arachnoidea*, are the following from Texas: L. H. Dewey, 1891; G. W. Letterman, No. 25, 1882; Newberry, 1859; Mex. Bound. Surv., No. 628.

Still more aberrant and probably worthy of a varietal name are some other Texan specimens which may be called:

4a. **Psilostrophe tagetina lanata,** n. var.*

Larger than the species, simple-stemmed or divaricately branched, long-lanate, floccose-woolly at the crown; leaves simple or pinnatifid and some of the stem leaves (often nearly all of them) sometimes deeply pinnately lobed; the lobes oblong-linear, entire or toothed; rays usually larger than in the species.

Specimens examined.—Texas: G. R. Vasey, 1881 (type); Mex. Bound. Survey, No. 629 (paratype); W. L. Bray, No. 416, 1899; (?) J. Reverchon, 1879. Type and paratype in National Herbarium.

5. **Psilostrophe pumila** (Jones) n. comb.

Riddellia tagetina pumila, Jones, Proc. Cal. Acad. Sci., (2) 5:700, 1895.

Psilostrophe Bakeri Greene, Pl. Baker. 3:29. 1901.

This perfectly valid species is certainly the handsomest one in the genus. That Mr. Jones' variety is the same as Dr. Greene's species

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*The type and paratype of *Psilostrope tagetina lanata* A. Nelson are in the National Herbarium under the herbarium numbers, respectively, of 156,585 and 26,581.

admits of no question. The following series of specimens, some distributed as one and some as the other, are remarkably homogeneous, as might be expected, since most of them are from type locality, which is the same for both. A fine example of this by Mr. Osterhout shows that the species under favorable conditions is not unusually low.

Specimens examined. Grand Junction, Colorado, M. E. Jones, 5474 (type), June, 1894; id. May, 1895; C. F. Baker, No. 106; S. G. Stokes, 1900; D. A. Saunders, No. 405, 1893; C. F. Baker, No. 14, Montrose; J. H. Cowen, No. 276, Hotchkiss; G. E. Osterhout, Rifle, Colorado.

6. **Psilostrophe sparsiflora** (Gray) n. comb.

Riddellia tagetina sparsiflora Gray, Syn. Fl. 1:318. 1886.

Stems 1–3 dm. high, singly from the several crowns of the woody root, noticeably striate, green but with a sparse hirsute pubescence which extends to the leaves; leaves alternate, linear, often narrowly so, rarely with one or two lateral teeth, 3–5 cm. long; the lower usually subspatulate and decurrent upon the long slender petiole; heads corymbose on the slender pedunculate uppermost branchlets; ray flowers 3, the ligule 7–8 mm. long and noticeably broader, sprinkled with minute resin or wax particles, the tube very short and only partially closed, the style protruding from the fissure; disk flowers 10 or fewer, tubular, fully twice as long as the unequal, acute or more or less lacerate-tipped pappus paleæ; akenes angled, not perceptibly striate.

This seems to be a singularly good species. I take as probably typical, of the plant that Dr. Gray so named as a variety, the form that occurs in Utah. That is truly with few heads. The Arizonan form is more freely flowered and with more numerous and more fascicled stems, but in all essentials they are the same. The green almost glabrous aspect, the regular alternation of the slender axillary branches and the almost umbellately-clustered slender-peduncled heads are characters quite peculiar to this species.

Specimens examined.—Utah: M. E. Jones, No. 5296, Pahria Canyon, 1894; Dr. Palmer, No. 246½, Southern Utah, 1877. Arizona: J. B. Leiberg, No. 5624, 1891; L. F. Ward, 1891; D. T. MacDougal, No. 229, 1898; H. H. Rusby, 1883; F. H. Knowlton, Nos. 182 and 272, 1889; M. E. Jones, Nos. 4038 and 6050a, 1884 and 1894; J. W. Toumey, No. 638, 1892.

I place here somewhat doubtfully Mr. Jones's No. 5291i, Pahria, Utah, 1894.

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VOL. XVI, PP. 25-28 MARCH 19, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW SPERMOPHILES FROM ALASKA.

BY WILFRED H. OSGOOD.

In the light of recently secured material two forms of the well-known Alaska ground squirrels or spermophiles appear to be undescribed. Specimens of both forms have been in the National Museum for some years, but the lack of material from Hudson Bay and other important localities has heretofore made it difficult to determine their relationships. For the opportunity of describing these new forms and for the freedom of the Biological Survey and National Museum collections I am indebted to C. Hart Merriam and Gerrit S. Miller, Jr.

Citellus* **plesius ablusus,** subsp. nov.

Type from Nushagak, Alaska. No. 119,815, United States National Museum, Biological Survey Collection, ♂ ad., September 16, 1902. W. H. Osgood and A. G. Maddren. Original No. 2043.

Characters.—Similar to *C. plesius*† but larger; adult in fall with the hairs of the tail with at least two and often more annulations of black; skull larger and heavier than that of *plesius* and slightly different in detailed characters; somewhat similar to *C. parryi* and *C. barrowensis* but

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*For use of the name *Citellus* instead of *Spermophilus* Cf. Allen, Bull. Am. Mus. Nat. Hist. XVI, pp. 375–376, 1902.

†Specimens now available indicate that *C. plesius* is entirely distinct from *C. parryi* and the several long-tailed forms related to it.

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tail much shorter; somewhat similar to *C. kodiacensis* but molar teeth actually and relatively larger; color less mixed with dusky.

Color.—Type (fall moult nearly complete): Sides of head, neck, and to a great extent, shoulders and nape, pale gray darkened in places by a blackish slate undercolor; eye-ring and subauricular spot pure white; forehead and crown burnt umber; middle of back and rump vandyke brown spotted with distinct quadrate grayish white spots from one-fourth to one-half an inch apart; underparts dull grayish white overlaying blackish slate except on middle of belly, where vestiges of an earlier pelage show creamy buff; under side of tail dark tawny medially, lateral hairs of new pelage with three to four black or dusky annulations each and a broad grayish white tip, hairs of pencil with one or two narrower dusky annulations and a broader black subterminal section about 27 mm. in width; tip of tail grayish white; feet creamy white.

Skull.—Similar to that of *C. plesius* but larger and heavier; nasals longer, relatively narrower, and more constricted posteriorly; molar teeth actually about as in *plesius*, therefore relatively small; molar teeth much smaller than in *barrowensis* but larger than in *kodiacensis.*

Measurements.—Type: Total length, 394; tail vertebræ, 103; hind foot, 60. Average of seven adult males from the type locality: Total length, 374 (359–394); tail vertebræ, 102 (95–108); hind foot, 59 (56–61). Skull of type: Basilar length of Hensel, 49; occipito-nasal length, 57.5; zygomatic breadth, 38; length of nasals, 21; alveolar length of molar series, 13.3.

Remarks.—Spermophiles from the naturalized colony at Unalaska and from points on the Alaska Peninsula have in late years been tentatively referred to *Spermophilus empetra*, representing the form which will now be known as *Citellus parryi*, as in the absence of specimens from other localities this was the only safe course. The colony at Unalaska was stocked some years ago by Mr. Samuel Applegate, a Signal Service observer, who took the live squirrels from Nushagak, then called Fort Alexander, and liberated them at Unalaska. During the past year I secured good series of spermophiles from Nushagak and the region of the base of the Alaska Peninsula. These of course agree with others from Unalaska and are easily separable from *plesius* aud *kodiacensis*, the only forms with which they need close comparison.

Citellus nebulicola, sp. nov.

Type from Nagai Island, Shumagin Ids., Alaska. No. 59,145 United States National Museum, ♀ ad., June 24, 1893. C. H. Townsend.

Characters.—Similar to *Citellus kodiacensis* but smaller, shorter-tailed and apparently paler colored; skull small and light with relatively narrow braincase and basioccipital.

Color.—Similar in general to that of *C. kodiacensis* but paler, the black and black-tipped hairs being much less numerous and the dusky about the nape and sides of head being much reduced; tail also with less black than in *kodiacensis.* No. 16,424, yg. ♂, buff phase: Underparts chiefly ochraceous, including chest, belly, forelegs, sides of face and neck; under side of tail tawny margined with buff and submargined with black for its distal half; forehead and crown mars brown; back nape, rump, etc. uniformly and closely spotted with creamy white quadrate spots on a ground of mixed black and russet.

Skull.—Similar to that of *C. kodiacensis* but smaller and lighter; molar teeth actually about as in *kodiacensis*, decidedly smaller than in *ablusus;* nasals rather narrow and elevated along the median suture as in *kodiacensis;* basioccipital much narrower; audital bullæ higher and fuller; braincase narrower.

Measurements.—Type (dry skin): Total length, 340; tail vertebræ, 82; hind foot, 53. Skull of type: Basilar length of Hensel, 42; occipito-nasal length, 49; zygomatic breadth, 32; length of nasals, 18; alveolar length of molar series, 12.

Remarks.—The small series of five specimens of *C. nebulicola* which I have seen contains but one skin in good pelage and this is unaccompanied by a skull. The others, including the type, are rather worn and unsatisfactory for comparison but are paler than *kodiacensis* in similar worn condition. The one skin showing fresh pelage is in a very ochraceous phase and shows much less mixture of blackish than *kodiacensis* in the same phase or stage of pelage. It is probable then that *nebulicola* will prove to be well characterized as far as color is concerned, at least in contrast with *kodiacensis.* The northern spermophiles of this group may be subdivided into two groups, one containing the large long-tailed forms with heavier teeth—*parryi*, *barrowensis*, and *osgoodi*—and another containing the smaller shorter-tailed forms with lighter teeth—*plesius*, *ablusus*, *kodiacensis*, and *nebulicola.* In the second group *kodiacensis* and *nebulicola* fall together on account of their smaller molar teeth as contrasted with *plesius* and *ablusus.* According to reports which I received from natives at Kodiak, the spermophiles were first brought there some years ago from North Semidi Island which lies a short distance west of Kodiak and between Kodiak and the Shumagin Islands. The relationship shown between *C. kodiacensis* and *C. nebulicola* is thus quite in accordance with their geographic positions.

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VOL. XVI, PP. 29-30 MARCH 19, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW PLANTS FROM NEW MEXICO.

BY AVEN NELSON.

Mr. and Mrs. Cockerell in their many collecting trips within the confines of New Mexico secure numerous specimens of great interest because of their limited representation in the herbaria or because of the fuller knowledge gained of the limits and variation of the species. As might be expected, in so large and even yet imperfectly understood a field as New Mexico, novelties are secured from time to time. The collectors have permitted the writer to study many of their numbers. Two of these are now proposed as new species.

Nyctaginia Cockerellae, n. sp.

Perennial, decumbent-spreading, with assurgent branches, 3–5 dm. high; stems and branches somewhat furrowed or angular, rough glandular-pubescent especially upward; leaves triangular-hastate, 4–9 cm. long, somewhat fleshy, rough-pubescent or glabrate, mostly acute at apex, the margin irregular, abruptly contracted to the rather stout petiole which is about half the length of the blade; involucre 8–12 flowered; its bracts linear-lanceolate, about 1 cm. long; calyx about 28 mm. long, trumpet-shaped; its long slender tube pale-green, clammy glandular-hairy; its limb of 6 short plicate emarginate crimson-scarlet lobes; stamens usually 6 (rarely 8), exserted some 12–13 mm.; the slender filaments united with the tube from the throat down; style exceeding the stamens and like them magenta colored; fruit lightly ribbed.

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A most distinct species, differing from *N. capitata* Chois. in its larger and subhastate leaves; in its calyx which has 6 emarginate lobes in contrast with 5 entire ones; in having 6 or 8 stamens which are united with the tube, in contrast with 5 nearly free ones; also in color and probably in duration.

The type (No. 59) was collected by Mrs. Wilmatte P. Cockerell (in whose honor the species is named) near Roswell, New Mexico, August, 1902. Mrs. Cockerell is an industrious student of the New Mexican flora and has found many interesting forms. It has also been collected near the same place by F. S. and Esther S. Earle, in 1900, No. 324. Type in Rocky Mountain Herbarium.

Cryptanthe dicarpa, n. sp.

Stems few to several from a very slender taproot, 8–15 cm. high, slender, moderately pubescent with rather long white softly-hispid widely-spreading hairs; leaves linear or very narrowly oblanceolate, 2–4 cm. long; spikes at length loosely-flowered; calyx-lobes distinct to the base, narrowly linear, almost reduced to the distinctly thickened midrib, the nutlets showing between them, about 3 mm. long in fruit; corolla white, its tube slightly dilated near the middle where the anthers are situated; nutlets grayish-white, only two maturing, these dissimilar, one larger more persistent and scabrous-roughened under a lens, the other minutely roughened-papillose.

In a general way related to *C. crassisepala* and its allies but slender-stemmed and quite distinct in its fruit characters. The type is No. 30, collected by T. D. A. Cockerell, at Mesilla Park, N. M. (Middle Sonoran Zone), and is deposited in the Rocky Mountain Herbarium.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF ELEVEN NEW MALAYAN MOUSE DEER.

BY GERRIT S. MILLER, JR.

[By permission of the Secretary of the Smithsonian Institution.]

The United States National Museum contains about two hundred Malayan mouse deer, most of which have been collected and presented by Dr. W. L. Abbott.* Two specimens of un-

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*See the following papers by the author of the present article:

Mammals collected by Dr. W. L. Abbott on Islands in the South China Sea. <Proc. Washington Acad. Sci., II, pp. 203–246. August 20, 1900 (*T. rufulus*, p. 227).

A new Mouse Deer from Lower Siam. <Proc. Biol. Soc. Washington, XIII, pp, 185–186, December 21, 1900 (*T. canescens*, p. 185).

Mammals collected by Dr. W. L. Abbott on Pulo Lankawi and the Butang Islands. <Proc. Biol. Soc. Washington, XIII, pp. 187–193. December 21, 1900 (*T. umbrinus*, p. 191).

Mammals collected by Dr. W. L. Abbott on the Natuna Islands. <Proc. Washington Acad. Sci., III, pp. 111–138. March 26, 1901 (*T. bunguranensis*, p. 113, *T. pallidus*, p. 116).

Mammals collected by Dr. W. L. Abbott in the region of the Indragiri River, Sumatra. <Proc. Acad. Nat. Sci. Philadelphia, 1902, pp. 143–159. June 11, 1902 (*T. pretiosus*, p. 144, *T. nigricollis*, p. 145).

Two new Malayan Mouse Deer. <Proc. Biol. Soc. Washington, XV, pp. 173–175. August 6, 1902 (*T. ravus*, p. 173, *T. borneanus*, p. 174).

Mammals collected by Dr. W. L. Abbott on the coast and islands of Northwest Sumatra. <Proc. U. S. National Museum, XXVI, pp. 437–484. February 3, 1903 (*T. amœnus*, p. 439, *T. jugularis*, p. 440, *T. brevipes*, p. 443, *T. russeus*, p. 444).

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usual interest have, however, been recently obtained through the kindness of Mr. B. S. Rairden, United States Consul at Batavia, Java. Study of this material as it was received has already led to the discovery of thirteen new forms. To this number eleven are now added, none of which appears to have hitherto been described and named.

Tragulus lutescens, sp. nov.

Type.—Adult male (skin and skull) No. 115,507 United States National Museum. Collected on Pulo Sugi Bawa, Rhio Archipelago, September 2, 1902, by Dr. W. L. Abbott. Orginal number 2011.

Characters.—A member of the *napu* group somewhat resembling *Tragulus canescens* of the Malay Peninsula, but not as large, and color much more yellowish; dark nape stripe present but not sharply defined; dark throat stripes heavily shaded with black.

Color.—Type: Back orange-buff, heavily clouded with blackish brown, but latter color not in excess of former. On sides the orange-buff fades rather abruptly through straw yellow to cream color, the black clouding at the same time becoming less noticeable and producing a finer grizzle, but this region is not distinctly contrasted with the back. Coarse fur of shoulders, neck, and nape orange-buff, of a tint somewhat lighter and duller than that of backs, and everywhere mixed with blackish hairs. Along median line these are so much in excess as to produce a broad dark stripe slightly speckled with yellowish and fading without sharp line of demarkation into color of sides of neck. Elsewhere the black produces a mere inconspicuous grizzle in the orange-buff. The dark nape stripe is continued forward between ears and eyes nearly to muzzle. Pale superciliary stripe well defined, concolor with cheeks and sides of neck. Over middle of eye it is about 10 mm. in width. Throat pattern normal, *the two dark stripes with only a little more yellow than in nape band.* Collar narrow but distinct, concolor with sides of body, therefore noticeably lighter than longitudinal dark bands. A clear orange-buff line extends forward from side of neck at level of front of dark throat stripes nearly to naked chin area where it meets its fellow of the opposite side. In a second specimen this line is rather wider than the white throat stripes and the two unite to form a broad patch extending back 30 mm. from naked chin area. Chest, belly, and inner surface of legs white, the chest with a narrow brownish median line, the belly faintly washed with yellow. In a second specimen this wash is much more extensive and many of the hairs producing it are tipped with blackish, causing a distinct clouding. Outer surface of legs like sides but slightly more yellow, the hind legs brightening to ochraceous above heel. Tail white beneath and at tip, dull orange-buff above, very slightly grizzled by a few blackish hair tips.

Skull and teeth.—The skull and teeth, except for their markedly smaller size, do not differ appreciably from those of *Tragulus canescens* and *T. napu.*

Measurements.—External measurements of type: total length, 563; head and body, 488; tail vertebræ, 75; hind foot, 131 (117); ear from meatus, 33; ear from crown, 28. Measurements of an adult female from the type locality: total length, 600; head and body, 510; tail vertebræ, 90; hind foot, 131 (117); ear from meatus, 34; ear from crown, 30.

Cranial measurements of type: greatest length, 105 (110)*; basal length, 96.4 (105); basilar length, 90 (99); occipito-nasal length, 96 (99); length of nasals, 32 (29); greatest breadth of both nasals together, 10 (12); diastema, 9 (9.6); zygomatic breadth, 44 (49); least interorbital breadth, 26 (30); mandible, 82 (89); maxillary toothrow (alveoli), 34.6 (40); maxillary premolars (crowns), 17.4 (20); mandibular toothrow (alveoli), 39 (46); mandibular premolars (crowns), 18 (22).

Weight.—Type, 2.5 kg.; adult female from type locality, 3 kg.

Specimens examined.—Two, both from Pulo Sugi Bawa.

Remarks.—This napu is so readily distinguished from all previously known species by its small size, normal throat pattern and strongly yellowish color that it needs no special comparison with any. The two specimens are closely similar to each other except that the female is, as usual, the larger. Some trifling variations in color have already been noted.

Tragulus flavicollis, sp. nov.

Type.—Immature† female (skin and skull) No. 115,505 United States National Museum. Collected on Pulo Sugi, Rhio Archipelago, August 24, 1902, by Dr. W. L. Abbott. Original number 1957.

Characters.—Much like *Tragulus lutescens* but yellower; nape stripe absent, and dark throat stripes very slightly shaded with black.

Color.—The general color is essentially as in *Tragulus lutescens,* but the tawny element is everywhere more distinctly yellow, this most noticeable on cheeks and neck. On nape the sprinkling of blackish hairs is as inconspicuous as at sides of neck, so that there is no trace of a dark median stripe. Throat pattern normal, the dark bands very slightly more sprinkled with black than sides of neck. Collar very narrow. The anterior yellowish bands are only about 15 mm. in length, leaving the entire throat from chin to main throat stripes pure white. Underparts as in the female specimen of *Tragulus lutescens,* but with less blackish clouding.

Skull and teeth.—I can detect nothing to distinguish the skull and teeth from those of *Tragulus lutescens.*

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*Measurements in parenthesis are those of an adult male *Tragulus canescens* from the Endau River, Johore. (No. 112,583.)

†Uterus contained a small embryo. Milk premolars still in place, though much worn.

Measurements.—External measurements of type: total length, 600; head and body, 520; tail vertebræ, 80: hind foot, 132 (117); ear from meatus, 37; ear from crown, 34. Skull: greatest length, 105; basal length, 98; zygomatic breadth, 44.

Weight.—3 kg.

Specimens examined.—One, the type.

Remarks.—In the character of its neck and throat markings *Tragulus flavicollis* agrees with the small, bright *T. rufulus* of Tioman Island and represents the opposite extreme from *Tragulus annæ*, in which the entire region is clear black. It only remains to discover species with the white of the throat obliterated by the encroachment of fulvous on the white bars to complete the possible variations of this pattern.

Tragulus formosus, sp. nov.

Type.—Adult male (skin and skull) No. 115,511 United States National Museum. Collected on Pulo Bintang, Rhio Archipelago, August 19, 1902, by Dr. W. L. Abbott. Original number 1907.

Characters.—A member of the *napu* group similar in general appearance to *Tragulus pretiosus* of Linga Island, but with dark nape stripe less defined, fulvous of neck and throat more red, and underparts usually more washed with yellowish. Premolars larger than in *T. pretiosus.*

Color.—Type: Upperparts bright orange-ochraceous darkening to ochraceous-rufous on neck and outer surface of legs and lightening to orange-buff on sides of body, the hairs everywhere drab at base and black at tip. The black tips are most conspicuous over middle of back, where they produce a heavy dark shading a little in access of the orange-ochraceous. On sides of body they are slightly less noticeable, and on sides of neck and head and outer surface of legs would readily escape observation. Crown and median line of neck black, both heavily sprinkled with ochraceous-rufous, the nape stripe so much so as to form no striking contrast with surrounding parts. Superciliary stripe distinct, about 7 mm. wide above eye, concolor with cheeks and sides of neck. Muzzle and ears blackish. Throat markings normal, the hairs of the dark bands blackish at base and heavily annulated with bright ochraceous-rufous. Collar narrow but distinct, its color intermediate between that of neck and sides of body. Underparts much like sides, but with a drab cast, except a pure white area on chest and another on hypogastric region, the former partly divided by a narrow brownish median line. The posterior white area is continued down inner side of hind legs, but that on chest is separated from white of inner surface of front legs by a narrow yellowish drab line. Tail ochraceous-rufous above, pure white below and at tip.

Skull and teeth.—I cannot see that the skull differs from that of *Tragulus pretiosus.* The permanent premolars both above and below, are, however, distinctly larger than in the related animal.

Measurements.—External measurements of type: total length, 600;

head and body, 530; tail vertebrae, 70; hind foot, 137 (124); ear from meatus, 39; ear from crown, 36. Average of four adult males from the type locality: total length, 613 (600-631); head and body, 536 (530-546); tail vertebræ, 77 (70-85); hind foot, 140 (137-142); hind foot without hoofs, 125.5 (124-127). Average of three adult females from the type locality: total length, 654 (620-693); head and body, 566 (535-593); tail vertebrae, 88 (80-100); hind foot, 141 (137-144); hind foot without hoofs, 126 (122-129).

Cranial measurements of type: greatest length, 106 (108)*; basal length, 99 (101); basilar length, 94 (95); occipito-nasal length, 97 (99); length of nasals, 33 (33.6); greatest breadth of both nasals together, 10.6 (11.6); diastema, 10 (11); zygomatic breadth, 47 (49); least interorbital breadth, 27 (29); mandible, 86.4 (88); maxillary toothrow (alveoli), 37 (36); maxillary premolars (crowns), 19 (18); mandibular toothrow (alveoli), 42 (42); mandibular premolars (crowns), 19 (18.4).

Weight.—Type, 3 kg. Average of four adult males, 3.5 (3-3.7). Average of three adult females, 4 (3-4.3).

Specimens examined.—Nine, all from Pulo Bintang.

Remarks.—Though rather closely related to *Tragulus pretiosus* the napu of Bintang is readily distinguishable from that of Linga by its more intense color, particularly of the throat markings and neck, and by the larger premolars.

Tragulus focalinus, sp. nov.

1777. "*Animalculus ex Java acceptus*" Pallas, Spicilegia Zoologica, fasc. XII, p. 18, footnote under *Antilopepygmæa.* No name.

1788. *Moschus javanicus* Gmelin, Syst. Nat., XIII ed., I, p. 174. Based on Pallas. Not *Cervus javanicus* Osbeck, 1765, or *Tragulus javanicus* of most recent authors.

1858. *Tragulus pelandoc* Blyth, Journ. Asiat. Soc. Bengal, XXVII, p. 277. Not *Moschus pelandoc* H. Smith, 1827.

1864. *Tragulus javanicus* A. Milne Edwards, Annales des Sciences Naturelles, 5e sér., Zoologie, II, p. 157. Not *Cervus javanicus* Osbeck.

1902. *Tragulus pelandoc* Stone and Rehn, Proc. Acad. Nat. Sci. Philadelphia, pp. 131, 132, June 4, 1902. Not *Moschus pelandoc* H. Smith, 1827.

Type.—Adult female (skin and skull) No. 120,574 United States National Museum. Collected near Buitenzorg, Java, in October or November, 1902. Received from B. S. Rairden, U. S. Consul at Batavia.†

Characters.—A member of the *kanchil* group distinguished from all others now known by the great width and distinctness of the tawny superciliary stripes, and by the grizzled gray neck strikingly contrasted with tawny body and head; no dark nape stripe; throat markings normal.

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* Measurements in parenthesis are those of the type of *Tragulus pretiosus.*

† Under date of November 17, 1902, Mr. Rairden writes: "I have had considerable difficulty in obtaining these animals, and am indebted to Dr. van Romburgh of the Botanic Gardens at Buitenzorg for assistance."

Color.—Type: Back raw-sienna, fading laterally through buff to the cream-buff of sides, the hairs everywhere ecru-drab at base and blackish at tip. The black tips produce a faint dark median area along back, but at sides the buff and cream-buff predominate. The grizzle produced by the dark and light colors is everywhere very fine and inconspicuous. Entire neck coarsely grizzled gray, the individual hairs black, each with a buffy white band 2-4 mm. in width at tip or just below. The gray area begins immediately behind cheeks and ears and continues to front of shoulder. At each end it passes abruptly into color of neighboring region. Anteriorly it shows a tendency to darken in the median line, but not enough to produce a dark nape band. Crown blackish, the hairs with dull inconspicuous tawny annulations. Cheeks and superciliary stripe dull orange-buff, a little speckled by dark hair tips, *the superciliary stripe nearly as wide as the median dark area.* Throat markings normal, the transverse bands united in front, and nearly concolor with neck, though slightly buff tinged. Collar like sides of body, but more strongly grizzled. Underparts and inner surface of legs pure white. Outer surface of legs raw-sienna, much brighter and more tinged with red on thighs. Tail raw-sienna above, pure white below and at tip. A second specimen from the type locality (immature male, No. 120,573) is in all respects similar except that the light annulations on neck are almost pure white, and the median line of chest and belly is washed with orange buff from just behind axillæ to level of thighs.

Skull and teeth.—The skull closely resembles that of *Tragulus kanchil* except that the rostrum is shorter and the audital bullae (in the two skulls examined) are narrower. Teeth as in *Tragulus kanchil.*

Measurements.—External measurements of type (from well made skin): total length, 410; head and body, 360; tail vertebræ, 50; hind foot, 105 (95); ear from meatus, 33; ear from crown, 26. Measurements of an immature male from the type locality (from well made skin): total length, 410; head and body, 365; tail vertebræ, 45; hind foot, 110 (100); ear from meatus, 30; ear from crown, 25.

Cranial measurements of type: greatest length, 88 (90);* basal length, 81 (82); basilar length, 77 (76); occipito-nasal length, 82 (82); length of nasals, 21 (21.6); greatest breadth of both nasals together, 12 (12); diastema, 10 (8.8); zygomatic breadth, 41 (39); least interorbital breadth, 26 (26); mandible, 65 (69); maxillary toothrow (alveoli), 32.4 (30.2); maxillary premolars (crowns), 16.2 (16.8*); mandibular toothrow (alveoli), 36 (35); mandibular premolars (crowns), 16 (17†).

Specimens examined.—Two, both from the type locality.

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* Measurements in parenthesis are those of the immature male already referred to.

† Milk teeth.

Remarks.—The gray neck and broad, yellowish superciliary stripe immediately distinguish *Tragulus focalinus* from all other known members of the genus.

Through the kindness of Mr. Witmer Stone of the Academy of Natural Sciences of Philadelphia, I have before me the Javan specimen recorded by Stone and Rehn as *Tragulus pelandoc.* It is an adult male (permanent dentition in place, but unworn) with colors somewhat faded from long exposure to light. In color pattern it exactly agrees with the male of *Tragulus focalinus,* except that the transverse throat stripes do not meet in front, a character which is doubtless individual. In size, however, it so much exceeds either of the specimens of *T. focalinus* (hind foot, 116; greatest length of skull, 95) as to suggest that it represents a distinct form.

The specific name *pelandoc* has been twice applied to a gray-necked *Tragulus,* by Blyth in 1858, and by Stone and Rehn in 1902. It was originally based, however, on the "Pelandok" of Raffles (Trans. Linn. Soc. London, XIII, p. 263, 1822) an animal which cannot be positively identified, but which is, so far as Raffles' account* and our present knowledge are concerned, not different from the *Tragulas kanchil* of Sumatra.

Tragulus virgicollis, sp. nov.

Type.—Adult male (skin and skull) No. 83,941, United States National Museum. Collected at altitude of 3000 feet on Mt. Dulit, Sarawak, Borneo, in June, 1895, by Ernest Hose and Charles Hose.

Characters.—Largest known member of the *kanchil* group (hind foot about 130). General color lighter and more yellow than in *Tragulus kanchil;* nape stripe clear black, narrow, and very sharply defined.

Color.—Type: General color above buff-yellow, heavily clouded with black on back, slightly on sides, where the ground color becomes paler. Cheeks and neck clear orange-buff, the former somewhat bleached and grizzled. Nape stripe clear black, sharply defined, only about 12 mm. in width. Crown brownish, faintly grizzled with yellowish. Superciliary stripe narrow and obsolete, though faintly visible in certain lights. Throat pattern normal, the oblique stripes united in front. Both collar and oblique stripes are essentially concolor with sides of neck, though the latter are rather heavily clouded with dark brown. Underparts and inner surface of legs white. Median line with a dull buff-yellow stripe, narrow and tinged with brownish anteriorly, about 35 mm. wide at middle of belly. Tail dull yellowish brown above, pure white below and at tip.

Skull and teeth.—The skull is similar to that of *Tragulus kanchil* except that it is larger and the rostral portion is more elongate. Teeth essentially as in the Sumatran animal, though the premolars appear to be less robust.

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* "The Pelandok is the least of the three [the others are the napu and the kanchil] in point of height, but has proportionably a larger and heavier body: it has also a larger eye." The context indicates that this statement rests on the authority of native accounts of the species.

Measurements.—External measurements of type (from well made skin): total length, 560; head and body, 470; tail vertebræ, 90; hind foot, 31.4 (19); ear from meatus, 35.6; ear from crown, 29.

Cranial measurements of type: greatest length, 98 (92)*; basal length, 90 (86); basilar length, 86 (79); occipito-nasal length, 92 (88); length of nasals, 30.6 (30); greatest breadth of both nasals together, 13.8 (13.4); diastema, 11 (7); zygomatic breadth, 42 (40); least interorbital breadth, 27 (26); mandible, 75 (70.6); maxillary toothrow (alveoli), 32 (31); maxillary premolars (crowns), 15.4 (16); mandibular toothrow (alveoli), 36.4 (36); mandibular premolars (crowns), 16 (16.4).

Specimens examined.—Three, the type from Mount Dulit, an adult male from Kinabatigan River and a female from the neighborhood of Sandakan.

Remarks.—The two specimens from British North Borneo have been so injured by the action of a preservative fluid that their color cannot be compared with that of the type. The color pattern is, however, the same. In general color the Bornean kanchil is not unlike *Tragulus ravus* of the Malay Peninsula, but the back is more heavily clouded relatively to the sides, and the nape stripe is of a very different character. In *Tragulus kanchil* the black clouding on both back and sides is noticeably in excess of the light element in the color, while in the Bornean animal this is true of the back only and even here to a distinctly less degree than in the Sumatran form.

Tragulus natunæ, sp. nov.

1894. *Tragulus javanicus* Thomas and Hartert, Novitates Zoologicæ, I, p. 660. September, 1894. Not *Cervus javanicus* Osbeck.

1895. *Tragulus javanicus* Thomas and Hartert, Novitates Zoologicæ, II, p. 492. December, 1895. Part, included *T. pallidus.*

1901. *Tragulus javanicus* Miller, Proc. Washington Acad. Sci., III, p. 115. March 26, 1901.

Type.—Adult female (skin and skull), No. 104,614 United States National Museum. Collected on Bunguran Island, North Natunas, July 9, 1900, by Dr. W. L. Abbott. Original number, 555.

Characters.—In general similar to *Tragulus kanchil,* but smaller (hind foot of females 112-118 mm.) and more yellow.

Color.—The color pattern in all its details exactly resembles that of *Tragulus kanchil* but the ground color of upperparts is bright tawny-ochraceous instead of yellowish buff, and the black clouding is not in excess of the ground color. Nape band, broad and conspicuous, slightly

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*Measurements in parenthesis are those of an adult male *Tragulus kanchil* from Tapanuli Bay, Sumatra (No. 114,426).

speckled by the yellowish annulations of some of the hairs, its lateral boundaries not very sharply defined. Crown dull brown, distinctly not as dark as in *T. kanchil,* and with most of the hairs noticeably annulated. Throat markings normal, the transverse dark bands united anteriorly. Both transverse bands and collar are ochraceous, but the former are distinctly clouded with a darker brown, much less so, however, than in *Tragulus kanchil.* Underparts with the usual yellowish markings; these not as dark as in *T. kanchil* and showing more of a tendency to spread laterally.

Skull and teeth.—The skull closely resembles that of *Tragulus virgicollis,* having a more elongate rostrum than in *T. kanchil.* This is particularly noticeable when the skulls are viewed from the side. The teeth do not, apparently, differ from those of the related species, but in the single male skull the premolars, both above and below, are remarkably heavy, and the first maxilliary tooth is strongly imbricated over the second.

Measurements.—External measurements of type: total length, 523; head and body, 460; tail vertebræ, 63; hind foot, 118 (106); ear from meatus, 31; ear from crown, 26. Average of five adult females from the type locality: total length, 524 (520-532); head and body, 468 (460-482); tail vertebræ, 58 (50-70); hind foot, 116 (112-118); hind foot without hoofs, 103 (100-106). Skull of type: greatest length, 97; basal length, 92; zygomatic breadth, 43; diastema, 12.

Weight.—Type 1.8 kg. Average of five females from Bunguran Island, 2 (1.8-2.3).

Specimens examined.—Five skins and one extra skull, all from the type locality.

Remarks.—Although *Tragulus natunæ* approaches the Bornean *T. virgicollis* in its elongated rostrum and yellow color it is readily distinguishable by its small hind foot and broad, not sharply defined nape stripe. The bright color alone is enough to separate it from *Tragulus kanchil.* With *Tragulus pallidus* of Pulo Laut, North Natunas it needs no comparison.

Tragulus subrufus, sp. nov.

1902. *Tragulus javanicus* Miller, Proc. Acad. Nat. Sci. Philadelphia, p. 143. June 11, 1902. Not *Cervus javanicus* Osbeck.

Type.—Adult female (skin and skull) No. 113,119 United States National Museum. Collected on Sinkep Island, South China Sea, September 5, 1901, by Dr. W. L. Abbott. Original number, 1285.

Characters.—Similar to *Tragulus kanchil* but color above slightly more yellow; and underparts much more extensively washed with fulvous.

Color.—The color above is slightly more yellow than that of *Tragulus kanchil* but not as bright as in *T. natunae.* Ground color orange buff, slightly paler on sides, and everywhere clouded with black, though less than in the Sumatran animal. Neck and outer surface of limbs tawny-ochraceous a little grizzled by blackish hair tips. Upper surface of tail ochraceous-rufous washed with dark brown. Nape band broad and distinct but not sharply defined at sides, black with a few yellowish specks. Crown dark brown, faintly grizzled. Throat markings normal, slightly darker than in *Tragulus kanchil.* Underparts strongly washed with orange-buff along median line, this wash usually spreading toward sides and often separating white of chest from that of inguinal region. While there is some variation in this character the suffusion is always more extensive than in the Sumatran animal, so that when series are compared the difference is very noticeable.

Skull and teeth.—The skull and teeth do not differ from those of *Tragulus kanchil.*

Measurements.—External measurements of type: total length, 540; head and body, 470; tail vertebræ, 70; hind foot, 125 (113); ear from meatus, 32; ear from crown, 28. Measurements of an adult male from the type locality: total length, 528; head and body, 450; tail vertebræ, 78; hind foot, 120 (108.5). Skull of type: greatest length, 97; basal length, 90; zygomatic breadth, 42.6; diastema, 10.8.

Weight.—Type, 2.27 kg. Adult male from type locality, 1.8 kg.

Specimens examined.—Nineteen: five from Sinkep Island and fourteen (three in alcohol) from Linga Island.

Remarks.—In a certain degree this species is intermediate between the dull, dark, *Tragulus kanchil* of Sumatra, and the very bright *T. natunæ.* It is readily distinguishable from both of the related species.

Tragulus rubeus, sp. nov.

Type.—Adult female (skin and skull) No. 115,522 United States National Museum. Collected on Pulo Bintang, Rhio Archipelago, August 20, 1902, by Dr. W. L. Abbott. Original number, 1914.

Characters.—Similar to *Tragulus subrufus* but with slightly larger skull and teeth and brighter colors.

Color.—Upperparts deep ochraceous-rufus, fading to tawny-ochraceous on sides and brightening to tawny on neck and outer surface of limbs. The back and sides are heavily clouded with black, about as in *Tragulus kanchil.* Underparts as in *T. subrufus* except that the fulvous is everywhere brighter and more red, very nearly approaching the ochraceous-rufous of Ridgway.

Skull and teeth.—The skull and teeth resemble those of *Tragulus subrufus* except that both average slightly larger.

Measurements.—External measurements of type: total length, 543; head and body, 478; tail vertebræ, 65; hind foot, 125 (113); ear from meatus, 36; ear from crown, 32. Two adult males from the type locality (Nos. 115,519 and 115, 521) measure respectively: total length, 545 and 522; head and body, 465 and 457; tail vertebræ, 75 and 65; hind foot, 120 (108) and 118 (106). Skull of type: greatest length, 99; basal length, 91; zygomatic breadth, 41.

Weight.—Type, 2.4 kg. Adult male (No. 115,519) 1.8 kg.

Specimens examined.—Five, all from the type locality.

Remarks.—This species differs from all other known members of the *kanchil* group in its dark, rich color and broad but inconspicuous nape stripe. Its characters are in every way parallel with those of the napu of the same island.

Tragulus ravulus, sp. nov.

1900. *Tragulus javanicus* Miller, Proc. Biol. Soc. Washington, XIII, p. 192. December 21, 1900. Part, specimens from Pulo Adang. Not *Cervus javanicus* Osbeck.

Type.—Adult female (skin and skull), No. 104,717, United States National Museum. Collected on Pulo Adang, Butang Islands, December 16, 1899, by Dr. W. L. Abbott. Original number, 161.

Characters.—Similar to *Tragulus ravus* of Trong, Lower Siam, but smaller, the neck paler, and the nape stripe more ill defined.

Color.—The color so closely resembles that of *Tragulus ravus** as to need no detailed description. The back and sides are light ochraceous-buff clouded with black, the two colors almost equally mixed, though the black is a little in excess on back. Throat markings and underparts as in *T. ravus.* Neck a lighter shade of ochraceous than in the mainland animal, and nape stripe ill contrasted with surrounding parts.

Skull and teeth.—The skull is not distinguishable from that of *Tragulus ravus*, but the teeth, particularly the upper premolars, appear to be more robust. The material at hand, however, is not extensive enough to prove that this character is constant.

Measurements.—External measurements of type: total length, 525; head and body, 450; tail vertebræ, 75; hind foot, 113 (103); ear from meatus, 32; ear from crown, 27. Measurements of an adult male from the type locality: total length, 518; head and body, 455; tail vertebræ, 63; hind foot, 112 (102). Skull of type: greatest length, 96; basal length, 89; zygomatic breadth, 41.8; diastema, 11.

Weight.—Type 1.8 kg. Adult male, 1.6 kg.

Specimens examined.—Two, both from Pulo Adang.

Remarks.—Although closely related to *Tragulus ravus* the kanchil of Pulo Adang appears to be sufficiently distinct to need recognition by name, though relative unfamiliarity with the group led me in 1900 to place it with the mainland form.

Tragulus lancavensis, sp. nov.

1900. *Tragulus javanicus* Miller, Proc. Biol. Soc. Washington, XIII, p. 192. December 21, 1900. Part, specimens from Pulo Lankawi. Not *Cervus javanicus* Osbeck.

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*See Proc. Biol. Soc. Washington, XV, p. 173. August 6, 1902.

Type.—Adult female (skin and skull), No. 104,412 United States National Museum. Collected on Pulo Lankawi, off west coast of Malay Peninsula (about 75 miles north of Penang), December 7, 1899, by Dr. W. L. Abbott. Original number, 132.

Characters.—Similar to *Tragulus ravus* but general color slightly more yellow and underparts extensively washed with orange-buff.

Color.—The color is very similar to that of *Tragulus ravus*, but the ochraceous-buff of the upperparts is noticeably brighter and more yellow, particularly that of back and sides. Chest and anterior half of belly strongly washed with dull orange-buff along median line, this suffusion tending to spread at sides so as to separate white of inguinal region from that of front part of chest. While this character is not wholly constant, it is sufficiently prevalent to impart a very different aspect to series of specimens of the two species.

Skull and teeth.—The skull and teeth do not differ appreciably from those of *Tragulus ravus*, though they probably average somewhat larger.

Measurements.—External measurements of type: total length, 520; head and body, 455; tail vertebræ, 65; hind foot, 117 (105); ear from meatus, 34; ear from crown, 29. Average of six adult females from the type locality: total length, 521 (505-545); head and body, 456 (435-480); tail vertebræ, 65 (65-65); hind foot, 118 (115-119); hind foot without hoofs, 105.5 (102-107). Skull of type: greatest length, 99; basal length, 94; zygomatic breadth, 42; diastema, 12.

Specimens examined.—Thirteen, all from Pulo Lankawi.

Remarks.—The more extensive material now at hand brings to light differences between this animal and the mainland from which passed unnoticed when I examined the island series in 1900. The yellowish suffusion on the underparts suggests that of the bright colored species from Sinkep, Linga, and the Rhio Archipelago, but is much less intense.

Tragulus lampensis sp. nov.

Type.—Adult female (skin and skull) No. 104,429, United States National Museum. Collected on Pulo Lampee or Sullivans Island, Mergui Archipelago, February 4, 1900, by Dr. W. L. Abbott. Original number, 299.

Characters.—Similar to *Tragulus lankavensis*, but yellower throughout, particularly on underparts.

Color.—The color is in general like that of *Tragulus ravus* and *T. lancavensis*, but is more strongly yellow than in either. The wash on the underparts is of the same extent as in *T. lancavensis*, but is a bright orange-buff.

Skull and teeth.—I cannot see that the skull and teeth differ from those of the related species.

Measurements.—External measurements of type: total length, 515; head and body, 460; tail vertebræ, 55; hind foot, 118 (108); ear from meatus, 33; ear from crown, 27. Two other adult females (Nos. 104,430 and 104,431) measure respectively: total length, 500 and 540; head and body, 435 and 470; tail vertebræ, 65 and 70; hind foot, 113 (104) and 118 (108). Skull of type: greatest length, 97; basal length, 91; zygomatic breadth, 42; diastema, 10.

Specimens examined.—Three, all from Sullivans Island.

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OF THE

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THREE NEW PLANTS FROM NEW MEXICO.

BY AVEN NELSON AND T. D. A. COCKERELL.

The material on which this paper is based has already been described in a general way in the preceding article. It was collected by Mr. and Mrs. Cockerell and has been studied conjointly by Professor Nelson and Mr. Cockerell.

Humulus Lupulus neomexicanus, n. var.

Leaves divided or sometimes parted, the segments varying from broadly lanceolate to nearly linear, acuminate, freely sprinkled with resin particles on the lower face; fruiting bracts ovate-lanceolate, usually acuminate, finely pubescent.

The hop indigenous in New Mexico seems to possess these characters in variance with the usual and more widely distributed form and may probably best stand as a variety. The type of the variety is No. 14, T. D. A. Cockerell, Beulah, N. M. (Canadian Zone) August, 1902. It is also abundant on the Vallé Ranch, Pecos, N. M., and was collected by Professor Wooton in the White Mountains of that State (No. 294).

Polemonium pterospermum, n. sp.

Low, 1-2 dm. high, glabrate below, glandular-puberulent above and in the inflorescence; stems several, spreading or decumbent at base, terete but for a few acute longitudinal ridges, very leafy, especially

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above; leaves broadly oblong in outline, 4–6 cm. long; the segments oblong, acute, 8–12 mm. long; the lower distinct and subpetiolate, the terminal crowded and slightly confluent; the petiole short or in the uppermost leaves wanting; flowers terminal or from the uppermost axils, in congested corymbs; calyx-lobes about equaling the campanulate tube; corolla purple, campanulate, 10–12 mm. long, quite as broad, the tube short, its lobes broadly ovate, moderately obtuse; filaments narrowly margined, shorter than the corolla, somewhat incurved, glabrous but involved in dense fine pubescence at the insertion; style filiform; the stigmas narrowly linear, exserted; ovules few, apparently only 2 or 3 maturing; the seeds narrowly wing-margined and subconcave ventrally.

This species has for its nearest allies *P. filicinum* Greene and *P. Archibaldae* A. Nelson, but it is a much smaller plant than either, with larger corolla and very different seeds. Collected at Cloudcroft, Sacramento Mountains (Canadian Zone), N. M., by T. D. A. Cockerell, September, 1900. Type in Rocky Mountain Herbarium.

Mertensia caelestina, n. sp.

Low and leafy, 5–15 cm. high, perfectly gabrous except for the ciliate-scabrous edges of the leaves and the calyx-lobes; leaves 2–3 cm. long, elliptic-oblong, tapering to both ends, subacute, the basal short-petioled; flowers congested in terminal clusters; pedicels short, slender; calyx cleft nearly to the base; calyx-lobes linear, subacute, about 5 mm. long; corolla dark-blue about 12 mm. long, tube a little longer than the calyx and the limb, the lobes broadly or truncately obtuse, the pubescence of the ring at the base coarse and conspicuous, appendages of the throat yellow; filaments dilated, as broad as or broader than the anther.

Collected by Mrs. Wilmatte P. Cockerell, No. 40, Truchas Peaks, N. M., above timber line (Arctic-Alpine Zone), 1902. Type in Cockerell Herbarium.

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OF THE

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TWO NEW WOOD RATS (*GENUS NEOTOMA*) FROM STATE OF COAHUILA, MEXICO.

BY C. HART MERRIAM.

Among the mammals collected by E. W. Nelson and E. A. Goldman in Coahuila, Mexico, in the spring of 1902, are two new species of *Neotoma*, which may be characterized as follows.

Neotoma navus, sp. nov.

Type from Sierra Guadalupe, Coahuila, Mexico. No. 116,895, ♀ ad., U. S. National Museum, Biological Survey Collection. April 26, 1902. E. W. Nelson and E. A. Goldman. Original No. 15,130.

Characters.—Size medium; tail rather long; ears medium. Similar to *N. mexicana* but tail decidedly longer; frontals expanded posteriorly unlike the previously known members of the *mexicana* group; anterior lobe of first upper molar cut in two by deep notch on inner side, as in *mexicana.*

Color.—Ground color of upperparts buffy ochraceous, moderately, evenly, and rather inconspicuously lined with black hairs; sides of face buffy ochraceous, the color reaching forward to nose (not stopping under eye as in *mexicana*); fore feet from wrists and hind feet from ankles white; head grayish; tail sharply bicolor, narrowly dusky above, broadly white below; underparts white, the plumbeous underfur showing through posteriorly; axillæ salmon.

Cranial characters.—Skull and teeth rather slender, about as in *N. mexicana*, which appears to be its nearest relative; bullæ small; premaxillæ exceeding nasals. The skull differs from that of *mexicana* in

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having the frontals expanded posteriorly, forming supraorbital shelves; anterior root of zygoma more slender, with smaller antorbital notches; bullæ decidedly smaller and less inflated anteriorly.

Measurements.—Type (♀): Total length, 350; tail vertebræ, 164; hind foot, 34. Adult male from same place: total length, 330; tail vertebræ, 152; hind foot, 36.

Skull of type.—Basal length, 37; zygomatic breadth, 21.5; palatal length, 21.5; diastema, 12; upper molar series on alveolus, 8.5.

Neotoma goldmani, sp nov.

Type from Saltillo, Coahuila, Mexico. No. 116,894, ♂ yg. ad., U. S. National Museum, Biological Survey Collection. April 18, 1902. E. W. Nelson and E. A. Goldman. Original No. 15,101.

Characters.—Size small; tail rather short, sharply bicolor; ears rather large; color grayish, becoming buffy ochraceous on flanks. Skull small, similar in general to that of *desertorum* but much smaller, with strikingly smaller bullæ; anterior lobe of first upper molar single and without anterior notch.

Color.—Upperparts buffy grayish, becoming buffy ochraceous on flanks; back well sprinkled with black tipped hairs, most abundant on posterior half; head and face gray, washed with buffy ochraceous on cheeks; underparts and feet white; tail above dark brown (nearly black in fresh pelage); below white or nearly white.

Cranial characters.—Skull small, light, and smoothly rounded, even in old age; frontals flat interorbitally, broad anteriorly and not expanded posteriorly (much as in *mexicana* but relatively broader and flatter); nasals narrowly wedgeshape, truncate behind; premaxillæ reaching far beyond nasals and somewhat expanded posteriorly; interparietal subtriangular, long transversely, strongly convex anteriorly.

Remarks.—*Neotoma goldmani* is a very small species with a peculiar combination of cranial and dental characters. It does not require close comparison with any known species.

Measurements.—Average of four from type locality: total length, 279; tail vertebræ, 128; hind foot, 30.

Skull of an adult male from type locality: basal length, 33; zygomatic breadth, 19; palatal length, 18.2; diastema, 11; interorbital breadth, 5.5; upper molar series, 7.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

GENERAL NOTES.

Three fishes new to the fauna of New Mexico.

When in the Pecos Valley last August, I obtained three species of small fishes, which have been very kindly identified by Dr. B. W. Evermann, and appear to be new to the fauna of our Territory.

Etheostoma lepidum (Baird and Girard). Dimmit Lake, near Roswell. The lake is small but very deep, at the base of the gypsum bluffs which skirt the Rio Pecos.

Notropis macrostomus Girard, and

Tetragonopterus argentatus Baird and Girard, both from North Spring River, just north of Roswell.—*T. D. A. Cockerell.*

Note on Phoca nigra Pallas.

In a recent paper on 'The Hair Seals (Family *Phocidæ*) of the North Pacific Ocean and Bering Sea' (Bull. Am. Mus. Nat. Hist., XVI, 1902, pp. 459-499), I suggested (*l. c.*, p. 483, foot note) that as Pallas's name *Phoca nigra* (1811), based on a young fur seal from the Kurile Islands, has priority over *Callorhinus curilensis* Jordan and Clark (1899), the Kurile Islands species would have to stand as *Callotaria nigra* (Pallas). I overlooked the fact, however, that *Phoca nigra* Pallas is preoccupied by *Phoca grœnlandica* var. *nigra* Kerr (1792). Consequently the Kurile Fur Seal will stand as *Callotaria curilensis* (Jordan and Clark).—*J. A. Allen.*

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A new name for Mus atratus Miller.

The name *Mus atratus* which I recently applied to a rat from the Nicobar Islands (Proc. U. S. National Museum, XXIV, p. 767, May 28, 1902) is preoccupied by *Mus atratus* Philippi (Annales del Museo Nacional de Chile, Entrega 14, p. 57, 1900). It may therefore be replaced by *Mus atridorsum*.—*Gerrit S. Miller, Jr.*

A new name (Hoplias) for the genus Macrodon of Müller.

The name *Macrodon* was given by Johannes Müller in 1842 for a well-known genus of *Erythrinoid* or *Characinoid* fishes. Although universally adopted since that time, it must be abandoned for the genus in question, inasmuch as it had been given as early as 1822 by Schinz, as a substitute for *Ancylodon* of Cuvier (1817), another preoccupied name (1811). The new designation *Hoplias* is proposed instead, and *Hoplias tareira* (*Macrodon trahira* Müller) or *malabaricus* is the type.—*Theo. Gill.*

The technical name of the Indian Flying Fox.

Pteropus medius, the current name for the flying fox of India, is not tenable. It dates from 1827, the year in which Temminck issued the first volume of his 'Monographies de Mammalogie' (the name is proposed on page 176), and, although earlier than Hodgson's *Pteropus leucocephalus* and McClelland's *Pteropus assamensis*, assuming that all three refer to the same animal, is itself antedated by the *Vespertilio gigantea* of Brünnich. This name was published at Copenhagen in 1782, on page 45 of a little-known book, a small quarto volume containing seventy-six pages and seven plates, entitled: "Dyrens Historie og Dyre-Samlingen udi Universitetets Natur-Theater. Förste Bind."* Although the bat is not among the species figured the description is detailed and accurate. The fact that the account was based on a stuffed specimen from Bengal, while Temminck's animal was collected at Calcutta, removes the last element of doubt as to the equivalence of the names. The common flying fox of India must therefore be known as *Pteropus giganteus*.—*Gerrit S. Miller, Jr.*

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*This work, of which only the first volume appears to have been published, was brought to my attention by Dr. Leonhard Stejneger. The new names that it contains are not mentioned by Fischer, Dobson, or Trouessart, but are all cited by Sherborn.

A note on the Florida Phœbe.

Through the kindness of Mr. Outram Bangs of Boston, and Mr. C. J. Maynard of West Newton, and through information received, *in litteris*, from Mr. William Palmer of Washington I am able to adjust so far as it is possible, with all the data that there is any prospect of obtaining, the relationships of the Florida Phœbe mentioned in "Notes on Various Florida Birds" (Contr. N. Amer. Ornith., Vol. I., May 21, 1902, p. 30).

In February, 1846, John Gundlach observed near Cardenas, Cuba, a pair of Phœbes, probably, though he does not state so, shooting both birds, as in his description he mentions peculiarities of both sexes. In 1850, Juan Lembeye, in his "Aves de la Isla de Cuba" (p. 41), included the species *Muscicapa fusca* Gmel., describing carefully both plumage and habits, evidently from the notes of Gundlach made in 1846 (see 'Prologo,' p. 6), and from a specimen No. 169 in the "Col. of Gundl." Later in 1852, Gundlach, in the Boston Journal of Natural History (Vol. VI, p. 314), described, evidently from the same specimen or specimens, an insular race, *Muscicapa lembeyei*, giving as careful description and measurements as did Lembeye himself.

It is evident therefore that Lembeye and Gundlach knew of only one pair of Phœbes to have visited Cuba, and although that island has had little extended ornithological investigation yet, recent collectors have failed to record the species. Mr. Palmer writes me that on his late visit to Cuba he saw a specimen of the Phœbe in the Gundlach museum [probably the same No. 169] but that the "Gundlach cases were so made that it was impossible to get at the birds."

To recapitulate: It is evident from Lembeye's and Gundlach's descriptions that the specimen or specimens they had were either stragglers from Florida or that the bird is a rare resident of Cuba, and for the resident southern Florida Phœbe there is no alternative but to use Gundlach's name, provided it is thought the form deserves to be recognized at all.

When I first examined Mr. Maynard's series of specimens from Enterprise, which show the brownish cast of plumage so often characteristic of the peninsular birds, I thought the race one decidedly worth recognizing, but a further examination of specimens from Miami and elsewhere proves that this coloring is not constant, and careful measurements also show that the greater size of the Florida bird does not always hold true.

It may be well to mention now while the subject is under discussion, that the type of Gundlach's *lembeyei* is without much doubt No. 169 in the Gundlach museum in Cuba, an example probably taken at Cardenas in February, 1846.—*Reginald Heber Howe, Jr.*

A new subgenus for Nyctaginia Cockerellae.

By the characters mentioned, *Nyctaginia Cockerellae* A. Nelson (Proc. Biol. Soc., Washington, XVI, p. 29), seemed to me to differ generically, but I am willing to follow Professor Nelson's decision to the contrary. *N. Cockerellae* forms, however, at least a distinct subgenus or section, which may be called *Roswellia.—T. D. A. Cockerell.*

On the name of the common American Eel

The name of the common American eel is now generally conceded to be *Anguilla chrysypa* Rafinesque, and the reference is given as "The American Monthly Magazine and Critical Review, Vol. II, p. 120 (Dec., 1817)," the article in which it is contained being entitled "First Decade of New North American Fishes, by C. S. Rafinesque."

Messrs. Jordan and Evermann, in the "Fishes of North and Middle America" (Bulletin 47, U. S. Nat. Mus. Vol. I, p. 348, 1896), give the derivation as from χρυσός, gold, and υπό, below. But on referring to the original article, we find that Rafinesque spells the word "*chrisypa*," the derivation for the word in this form being Χρἲσις (from χρίω) meaning an anointing, a besmearing, and υπό, below. In his account of the eel, he gives the vernacular names, referring to it as "Gold-Eel, Silver-Eel, Lake-Eel, Gold-Breast, etc." It is from this last mentioned name that the confusion doubtless arose.

Although there is no way of ascertaining which of these derivations is correct, whether Rafinesque really meant to turn the name "Gold-Breast" into Greek and made a slip, or whether he intended to refer to the slimy character of the fish, it seems best to retain the original spelling as given by him, as it is just as plausible as that adopted, and we are not now in a position to make really certain which idea he entertained, as all that he has left us is the name *chrisypa*.

As regards the name *bostoniensis* of Le Sueur, on looking up the reference (Jour. Phil. Acad. I, p. 81) we find that it was given in a paper entitled "A short description of five (supposed) new species of the genus Muræna discovered by Mr. Le Sueur in the year 1816," which was read before the society on August 19th, 1817. As Rafinesque's name is dated in his article December, 1817, *bostoniensis* would seem to have priority over *chrisypa*. But we find that Le Sueur's name was not published until 1821, whereas Rafinesque's appeared in 1817.

Therefore, the name of the common American eel should stand as *Anguilla chrisypa*, Rafinesque.—*Austin H. Clark.*

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A NEW REITHRODONTOMYS FROM WESTERN NEBRASKA.

BY MERRITT CARY.

Among some mammals collected by me in the Sand Hill region of Nebraska, in the spring and fall of 1901, is a well marked species of *Reithrodontomys* which has hitherto remained undescribed. It may be known from the following description:

Reithrodontomys albescens sp. nov.

Type from 18 miles northwest of Kennedy, Nebraska, ♂ adult, No. 116,358, United States National Museum, Biological Survey Collection. Collected October 31, 1901, by Merritt Cary. Original number 411.

General characters.—Size small; tail short (ratio of length of tail to total length 45); colors extremely pale; pelage long, full and soft; ears small, with two distinct black spots.

Color.—Sides pale buffy gray; dorsum darker and plain gray, or with a tinge of buff; lateral line, between the pinkish buff and cream buff of Ridgway, continuous from cheeks to thighs; sides of nose, lower portion of cheeks, throat, forelegs and rest of underparts pure white; tail well haired, sharply bicolor, the dark line on upper surface narrow; upper surfaces of feet white.

Cranial characters.—Compared with *nebracensis* from the same type locality the skull is much smaller (averaging 1.62 mm. shorter, and 8 mm. narrower across mastoids, in a series of 5 adults), with relatively shorter rostrum and narrower interparietal; nasals less deeply concave above.

Measurements. — Three adult specimens from type locality average: total length, 125; tail vertebrae, 53.5; hind foot, 16.6. Type: Total length, 124; tail vertebrae, 54; hind foot, 16.5. Skull of type: Basal length, 15.7; occipito-nasal length, 19.7; nasals, 17.4; zygomatic breadth, 10.5; mastoid breadth, 9.

Specimens examined.—Total number 18, from the following localities:

Nebraska: Neligh 11, Kennedy 5, Cody 1. South Dakota: Belle Fourche River (15 miles from mouth) 1.

Distribution.—Sand hill region of central and western Nebraska, and western South Dakota. Limits of range unknown.

Habits.—This species, so far as at present known, occurs only in sand hills, or on sandy land, where it appears to subsist to a large extent on seeds of various grasses. Near Kennedy, in October, I secured several specimens by overturning millet shocks in a sandy field. When uncovered the little fellows would scurry to their nest for refuge.

The nests were compact little balls of fine grass, and were either on or just beneath the surface of the ground under the shock. A small opening on one side led into a little cavity in the interior, in which was a store of millet seeds.

At both Kennedy and Neligh, in sand bur and weed patches in the sand hills *albescens* and *nebracensis* were about equally abundant, but traps set in meadows or marshy tracts secured only *nebracensis.*

Remarks.—This handsome little species requires no close comparison with any described *Reithrodontomys.*

From *nebracensis* it differs in much smaller size and paler coloration, entirely lacking the strong fulvous suffusion. The ears are relatively much shorter, and the rusty hairs at their bases are scarcely noticeable, or entirely wanting. The tail is much more sharply bicolor and the black stripe is confined to the upper fourth.

One October specimen from Kennedy, and two November specimens from Neligh, are pale ashy gray, with no trace of the buff. Whether or not this is the normal winter pelage is yet to be determined.

A June specimen from Belle Fourche River, South Dakota, considered by Allen (Bull. Am. Mus. Nat. Hist., N. Y. VII, p. 123, 1895,) a pale specimen of *nebracensis,* seems to be referable to *albescens.*

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OF THE

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A NEW GENUS AND SPECIES OF DRAGONFLY FROM BRAZIL.

BY JAMES G. NEEDHAM.

Having used a figure of the wings of this species in a paper soon to be issued in the Proceedings of the U. S. National Museum, I herewith make public the full description of both genus and species.

Cyanocharis gen. nov.

Allied to *Heliocharis:* Fam. *Calopterygidae* of *Odonata.* Nodus midway between base and apex of wing. Two hypertrophied antenodal crossveins, the straight arculus situated just beyond the first of these. Extra half antenodal crossveins in the basal subcostal space, but no crossveins traversing the space before the arculus. Quadrangle divided by a single crossvein. Subquadrangle open, longer than the quadrangle, but hardly more than half as wide. Anal margin coincident with the anal vein almost as far as the subquadrangle. Vein M_{1-2} separating from vein M_3 just beyond the quadrangle by a stalk so transverse it appears as a crossvein, and then fused in one or two places with vein R. Vein M_2 separating from vein M_1 a space beyond the subnodus. Stigma large, very oblique at its proximal end. A single long interpolated sector between veins M_1 and M_2. The radial sector stronger than adjacent veins and slightly bent forward beyond the nodus. Vein Cu_2 forked with two rows of cells included in the fork. Legs very long and slender, with numerous exceedingly short spines, the femora arcuate. Claws minutely bifid at extreme apex. Superior abdominal appendages of the male simple, curved; the inferiors rudimentary.

Type, *Cyanocharis valga* sp. nov.

This genus is intermediate in a number of characters between *Heliocharis* and *Dicterias* of the same region, but seems allied to the former by more important characters. It differs, however, from *Heliocharis* in the separation of vein M_{1-2} from vein M_3 close beyond the quadrangle, and in its subsequent fusion with the radius, and in the condition of its antenodal crossveins.

It differs utterly from *Dicterias* in the arrangement of its interpolated sectors, in the remoteness of the nodus from the base of the wing, in the form and position of the posterior branch of the cubitul vein, and in type of coloration.

Cyanocharis valga sp. nov.

Length, 62 mm; abdomen, 44 mm; hind wing, 35 mm.

Colors greenish-blue and black. Head blackish, with the labrum, the post-clypeus, and the occiput behind the eyes greenish. Antennae black, the second joint twice as long as the first and but half as thick, the remaining five joints together but little longer than the second, each of them a little shorter than the one before it. Mouth strongly projecting, the squarely cut post-clypeus being horizontal, the ante-clypeus vertical and the labrum sloping. Median ocellus large, lying in a wide longitudinal furrow; lateral ocelli smaller, each confined to the outer aspect of a conical vertical spine. A [-shaped sulcus behind the ocelli sharply defines the occipital crest, which is thinly fringed with tawny hairs.

Prothorax blackish, fenestrate with green, three greenish patches on either side, a twin spot of paler green upon the middle, and a broad greenish crescent lying transversely upon the rather prominently elevated, black bordered posterior lobe. Thorax with blackish carinae. Ground color greenish blue (turquoise blue), with narrow stripes of brown on all the sutures, the middorsal one divided by the black of the carina. There is also a well developed, isolated, antehumeral stripe of brown.

Legs excessively long and slender, appearing bare by reason of the minuteness of their numerous spines. Hind and middle femora slightly, and fore femora and tibiae strongly curved. Claws with a very minute tooth so near the tip that it appears bifid, hardly distinguishable in the front tarsus. Wings hyaline, slightly tinged with brown at the extreme tip: stigma brown. Antenodal crossveins 18 in the fore wing and 15 in the hind wing, with 4-5 half antenodals additional in the basal subcostal space: 17 and 14 postnodals in the fore and hind wing respectively. Stigma long, covering 5-6 cells, and reaching nearly to the wing apex, there being but three minute crossveins in the space beyond it. Between veins M_1 and M_2 are five interpolated sectors, only the middle one being of more than a few cells length: between Rs and M_3 are four sectors, the third longest: there are two sectors between M_2 and Rs, two between M_4 and Cu_1, and two behind Cu_2, the second of these appearing as a branch: there is a single row of cells, except at the extreme margin between M_3 and M_4, and between Cu_1 and Cu_2. The fusion of veins M_{1-2} with the radius occurs just before the second hypertrophied antenodal crossvein.

Abdomen cylindric, greenish blue dorsally, with dagger-shaped mark of black upon the dorsum of each segment, the color and markings becoming obscured apically in the type specimen (perhaps from fading). Segments 3-7 of equal length: segments 8, 9 and 10 each successively one-third shorter than the preceding segment. Superior appendages a little longer than the 10th segment, simple, depressed beyond the base, a little arcuate with the tips slightly convergent, rounded without, but with a fine longitudinal carina within, and armed wlth minute prickles dorsally and toward apex: color black, with the extreme apex yellow. Inferior appendages rudimentary.

Poco Grande, Brazil, January 13, 1898, Mr. Adolph Hempel, collector. The type is in the Cornell University Collection.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF FLYING LIZARD FROM SARAWAK, BORNEO.

BY THOMAS BARBOUR.

The following species which does not appear to have been previously characterized is one found among a considerable number of Reptiles and Batrachians collected in Borneo.

Draco gracilis, sp. nov.

This species approaches *Draco cornutus* in its general proportions; but it differs from the latter in coloration, squamation, and number of labials.

Description.—Habit slender. Head moderate; length of snout about equal to orbital diameter. Nostril lateral, directed outward. The hind limb pressed forward reaches the fore limb pressed backward at a point about half-way between wrist and elbow. Tympanum naked, with scales encroaching somewhat from the margins; smaller than eye opening. A prominent tubercle on the posterior part of the supraciliary region. A rather small nuchal crest, consisting of a single row of triangular scales. Crown scales, dorsals, and ventrals keeled. The nuchals and scales on temple are very slightly or not at all carinate. There is a row of triangular spinelike scales along each side of the body, just at the base of the wing membrane. The gular pouch is longer than head, and of the thirteen upper labials the last is the largest.

Color (alcoholic specimen). Dorsal surfaces light greyish brown. Ventral regions light gray. Neck and throat specked with rather dark brown. Forehead dark brown. A number of blackish spots at the base of the gular pouch. Upper surfaces of the wing membranes dark orange with irregular black bands; under surfaces whitish, barred with rich brown or black. On the upper surfaces of the body the metallic lustre is decidedly noticeable on the spots in front of the shoulders and along the ribs on the wing membranes. The bases of the latter are very thickly spotted with metallic specks, each covering a single scale. There is a strong light yellowish serration along the inner surfaces of the femur and tibia; this is formed by a single series of enlarged, flat, triangular scales.

Another specimen verifies all the specific characters shown by the type; but this second example shows the femur-tibia fringe to an even greater extent. It is also lighter in color on the forehead. The specimens were collected in Sarawak, Borneo, by W. T. Hornaday, Esq., Director of the New York Zoological Park.

Type 6713, (adult ♂); of the Reptilian Collection in the Museum of Comparative Zoology.

Measurements:—Length of head, 15 mm.; width of head, 9 mm.; length of body, 57 mm.; length of forelimb, 27 mm.; length of hind limb, 30 mm.; length of tail, 109 mm. Total length, 177 mm.

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PROCEEDINGS

OF THE

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TWO NEW SPECIES OF CHAMAELEON.

BY THOMAS BARBOUR.

An examination of the large collection of Chamaeleons in the Museum at Cambridge, Mass. discloses two species apparently hitherto undescribed. Remarks on their characters follow.

Chamaeleo angusticoronatus n. sp.

Near *Chamaello dilepis*, but differing in the peculiar narrowness of the casque, the squamation of the body and the prominence of the dorsal tubercular crest.

Specific characters.—Casque well raised posteriorly; the lateral crests decidedly marked from their origin on the snout to a point about halfway from the eye to the extremity of the casque; at this position they quickly become indistinct and disappear. Above the casque narrows suddenly to a very acute point, beginning to show the compression just where the lateral crests vanish. The surface of the body is very finely granular, and the dorsal crest is hardly noticeable except for a short distance directly behind the casque. The tail is slightly longer than the head and body.

Type.—An adult female from Zanzibar, No. 6712, of the Reptilian Collection in the Museum of Comparative Zoology.

Measurements.—Total length, 226 mm.; length of mandible, 24 mm.; tip of snout to extremity of casque, 33 mm.; greatest width between lateral cranial crest, 13 mm.; width of head, 18 mm.; depth of skull, including mandible, 27 mm.; length of head and body, 110 mm.; length of tibia, 21 mm.; length of tail, 116 mm.

Chamaeleo macrorhinus sp. nov.

Specific characters.—Casque not elevated posteriorly. A single large dermal fold, unnotched and undivided on the median line, borders the casque from shoulder to shoulder. There is neither a lateral nor a parietal crest on the casque, nor dorsal, ventral nor gular crest on the head and body. The whole surface of the body is covered with rather small, subequal, polygonal, granular tubercles. On the snout there is a large oblong dermal process covered with round granules. At a little more than half way between the eye and the dermal process there is, on each side, an excrescence composed of a number of elongated tubercles partially fused. The tail is of about the same length as the head and body.

Type.—An apparently adult female from Madagascar, No. 5988, of the Reptilian Collection in the Museum of Comparative Zoology.

Measurements.—Total length, 85 mm.; length of mandible, 11 mm.; tip of snout to extremity of casque, 16 mm.; greatest width between lateral cranial crests, 6 mm.; width of head, 9 mm.; depth of skull, including mandible, 12 mm.; length of head and body, 43; length of tibia, 8 mm.; length of tail, 42 mm.

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PROCEEDINGS

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MAMMALS OF MT. KATAHDIN, MAINE.

BY B. H. DUTCHER.

In the summer of 1902, I spent from July 10 to September 5 in an attempt to determine the mammalian fauna, and in general the faunal zones of Mt. Katahdin in north central Maine. This mountain was chosen because, as far as I know, no mammal work had ever been done in its vicinity, and because of its height and isolated position.

The old idea of Katahdin, printed even in geographies, was that of an extinct volcano, an assumption very excusable in those whose views of the mountain were from a distance, for the "basins" or heads of the old glacial valleys on the eastern side, with their wide encircling walls on the north and south, give the appearance of a great crater blown out on one side. A closer examination reveals the fact that the mountain is in reality a granite ridge of very irregular outline with its major axis lying north and south, flanked by precipitous buttresses, the glacial retaining walls, that project out to the east, west, and north, and drop rapidly away in slopes of high degree on face and point. On the east, north, and west are a number of smaller ridges, timber covered, nestling under the shelter of the greater mountain, and separated from it by valleys and basins. These minor ridges, Hunter Mountain, Traveler Mountain and the

Four Brothers, vary from about 2000 feet to 3000 feet in height. Katahdin itself reaches 5200 feet.

The top of this great ridge is an undulating plateau, shaped in a very general way like an hour-glass. Its lowest point, which is at the waist, is about 4200 feet, whence the surface slopes gradually upward to the north and south. The highest elevation is reached in the south peak, 5200 feet. The two northern peaks, merely somewhat elevated points in the general surface, reach to about 4700 feet. The plateau surface measures probably four miles from north to south, and a mile in width at the north and south expansions. The ground is rock strewn and grassy, with an extensive area of fir scrub—krummholz—near the constriction, and on the northwestern promontory. From the plateau edges, the mountain falls rapidly away. On the east, the north and south spurs, with precipitous rock walls, enclose two great basins—the "north" and the "great"—separated by a long sloping ridge that comes down from the saddle. The more southern of these two basins is itself imperfectly divided into the "south" and the "middle" basins by another and smaller spur. The head of the middle basin is inclined sufficiently to support vegetation, and by a slide at its head affords easy access to the saddle by the old Appalachian Trail. The only other trails to the top are the Abol Trail up the steep south wall of the southwest promontory, and an old unused trail up the crest of a long promontory that leads north and helps enclose a deep glacial basin on the north face of the mountain. The western slopes are somewhat less precipitous, and lead down to a wide flat valley, mountain-locked by Katahdin and its daughter hills on the west. The country surrounding the mountain is comparatively level, almost completely forested, and dotted with lakes, ponds, and sphagnum bogs. The only forest denudation has been by fire.

The floor of the great basin, in which I had one of my camps, slopes from about 3400 feet at its head to 2400 feet at its eastern edge. A small glacial lake, Chimney Pond, occupies part of the south basin. The floor of the north basin is about 3500 feet above sea level, is more extensive than either the south or middle basins, and has elevation enough to render it devoid of high timber. Its floor is in places free from tree growth, and in places along its lower edge, covered by scrub firs. Its eastern edge is marked by a very small glacial pond in the moraine. The middle basin is covered to its head with a forest of balsams, which climb 100 feet above it, to 3500 feet in suitable localities.

The entire mountain is composed of white and pink granite. The plateau is covered with rough granitic masses that are being disintegrated by frost. This leveling action of the frost has in places evenly carpeted the surface with small granite flakes, varying from the size of the hand to three or four times as large.

The rainfall is so great on the mountain top that its entire surface is moist at all times, and there are at least four perennial seepage springs on the tableland. Two of these are in the fir scrub, which has been cleared for a short distance around them by the gathering of animals to drink in times gone by. The water does not flow out on the surface, but is found subterraneously in little depressions among moss-covered rocks. At one of these springs, at an altitude of 4500 feet, I camped for four nights, while attempting to secure specimens of the native microtine.

Trapping was done at various localities from the base camp, at the union of the Wissataquoick and East Branch Penobscot Rivers, at 450 feet, to the tableland, at 4500 feet.

The following 36 species of mammals are recorded from Mt. Katahdin.

Rangifer caribou (Gmel). Woodland Caribou.

The caribou is an animal of the past in the Katahdin region. Today all that remains is its bones in the porcupine dens. From accounts received, there have been two migrations of caribou from northern Maine, within the memory of inhabitants now living. The last of these occurred about six years ago.

Unfortunately the awakening of public sentiment in regard to the importance of game preservation did not take place while the animals were still abundant, and their absence now can in part at least be attributed to wanton destruction.

Alces americanus (Clinton). Moose.

The recent protective legislation has in the opinion of the natives, resulted in allowing a very considerable increase in the numbers of moose.

Judging by the sign observed, they are comparatively abundant on the base of, and near the mountain. They range up to timberline in favorable localities. Man is practically the moose's sole destructor, and if the killing in defiance of law that takes place to feed the lumber camps were prevented, there would be a still greater increase. It is very difficult to secure evidence against these malefactors. The lumber camps are so isolated that all the persons in them, and in their vicinity, are to a certain extent beneficiaries directly or indirectly, from the fresh meat secured, and are hence *particeps criminis.* The danger of detection in a camp of sixty men, where one animal can be entirely consumed in a short time, is very small, and evidence is not easily obtained.

Odocoileus virginianus borealis (Miller). Northern Virginia Deer.

Deer are really abundant in the Katahdin region. It was not unusual to see as many as five in the course of an afternoon's walk. They sometimes prove a nuisance by destroying unfenced gardens.

One was seen near Chimney Pond, at an altitude of about 3000 feet. They are not common at this altitude however. In spite of the illegal hunting that takes place they appear to be on the increase.

Sciurus hudsonicus loquax (Bangs). Southeastern Red Squirrel.

Red squirrels are abundant throughout the region, extending even to the treeless tableland of the mountain, where I saw one at close range, August 28. Another was seen by one of our cooks in the same locality.

At Chimney Pond camp, altitude 3000 feet, they were abundant.

Only four specimens were secured, though had I foreseen the difficulty of determining their proper designation with respect to the published subspecies of *Sciurus hudsonicus,* I would have taken a large series.

The measurements and colors of my specimens correspond with the description of *S. h. loquax,* described as the upper austral and transition race. But these animals were taken at 3000 feet elevation on the 46th parellel north, and almost within sight of the type locality of *S. h. gymnicus,* the boreal race of the same species, though 2000 feet above it.

A careful examination of the material in the Biological Survey Collection and in the American Museum of Natural History, leaves me totally unable to harmonize the descriptions of the two races with specimens from their respective faunal stations, or to appreciate constant differences as described in individuals from transition and boreal regions.

A comparison of dimensions shows nothing conclusive, and I am led to the belief that the differences on which these two forms are separated are not of sufficient degree or constancy to justify their separation. I propose therefore to call the Red Squirrel from the Katahdin region

S. h. loquax, as it most closely corresponds to this form in color and size, doubting very much whether the consideration of more material from the regions involved will not show that the two forms are in reality not entitled to separate names, and that *S. h. gymnicus* should be retired. I am the more inclined to this belief after reading Mr. Preble's description of typical *Sciurus hudsonicus.**

Tamias striatus lysteri (Richardson). Northeastern Chipmunk.

Chipmunks were common on the hardwood ridges of the low ground, but I saw none at the higher elevations where the deciduous trees were not so abundant.

One specimen taken at 500 feet altitude is typical *lysteri.*

Arctomys monax (Linn.). Woodchuck.

Fairly common on the lowlands.

Sciuropterus sabrinus macrotis (Mearns). Canadian Flying Squirrel.

A living specimen was kept in the lower camp. These squirrels are common on the hard wood ridges. As usual however, unless trapping for fur, one does not secure them.

Castor canadensis (Kuhl). Beaver.

The beaver is now protected during all seasons in Maine. I heard of a few colonies, on rather poor authority, but the animal no doubt exists in secluded localities.

Mus musculus (Linn.). House Mouse.

Common in dwellings.

Peromyscus canadensis (Miller). Canadian White-footed Mouse.

Nine specimens were taken that correspond perfectly with specimens of typical *P. canadensis* in the Biological Survey Collection. They were secured from the lowest to the highest trapping grounds, one individual being taken under a rock on the tableland, but they are not abundant animals.

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*North American Fauna No. 22, p. 45, 1902.

Synaptomys cooperi (Baird). Cooper Lemming Mouse.

Two species of the genus *Synaptomys*, representing both subgenera occur in the Katahdin region.

Of the subgenus *Synaptomys*, one specimen was taken August 3, in a small grassy clearing in the woods at an altitude of about 500 feet, that seems, on comparison with material in the Biological Survey Collection, to be intermediate between *S. cooperi* and *S. fatuus*, but which from its habitat I refer to the former.

Synaptomys sphagnicola (Preble). Preble Lemming Mouse.

Of the subgenus *Mictomys* two examples were taken, August 28, and August 30, respectively, under some balsam scrub by a spring on the table land, at an altitude of 4500 feet.

A thorough and painstaking search was made of the entire top of the mountain, and a line of nearly ninety traps was carefully set, baited, and tended, but the only microtines secured were these two lemmings. Strange to say the entire top of the mountain was covered with old sign, without doubt of this species.

Fiber zibethicus (Linn.). Muskrat.

Exceedingly abundant. While canoeing one day, I paddled up within a few feet of one asleep at the water's edge. While we were watching him he half opened his eyes, apparently looking directly at me, and leaning down lapped the water at his feet, then closed his eyes and relapsed into slumber. If his eyes had seen, his cerebrum had not interpreted, and he did not recognize his dangerous position. A slight noise sent him to the bottom like a flash.

Microtus pennsylvanicus (Ord.). Meadow Mouse.

Contrary to expectation the meadow mice were rather scarce. When I arrived on July 10, the meadow lands available for their homes were many inches under water, and a search of the higher land, revealed but few signs of any kind. A few were found along the rivers, one at 1500 feet, and one at Chimney Pond, at 3000 feet.

Evotomys gapperi (Vigors). Redbacked Mouse.

Fairly common in the higher woods, up to 3500 feet, and probably on the lower levels too, though none were caught there.

Zapus hudsonius (Zimmermann). Meadow Jumping Mouse.

Found in all suitable localities from 500 feet to 3000 feet altitude.

Napæozapus insignis (Miller). Woodland Jumping Mouse.

About as common as, and found in the same meadows with *Zapus.*

Erethizon dorsatus (Linn.). Canada Porcupine.

Very common from the river to the summit of Katahdin. Their dens in the fir scrub and rock heaps were filled with caribou bones, that were deeply chiseled by their incisors.

Lepus americanus virginianus (Harlan). Southern Varying Hare.

The varying hare occurs on the tableland, where I trapped one in an old caribou trail in July. It corresponds with specimens obtained at 1500 feet, and all are comparable with other examples of *L. a. virginianus* in the Biological Survey Collection.

Lynx canadensis (Kerr). Canada Lynx.

Rather a common animal, if the accounts of guides are correct.

Vulpes fulvus (Desmarest). Red Fox.

Quite common throughout the lower parts of the region, where they are often seen on roads.

Lutra canadensis (Schreber). Otter.

Quite common along the lower streams and ponds where fish abound.

Gulo luscus (Linn.). Wolverine.

The trappers all denied having seen or heard of the wolverine in the region, though they were acquainted with the animal by repute.

Mustela pennanti (Erxleben). Fisher.

From the accounts of our cooks the fisher is one of the commonest and most valuable of their fur bearing catch.

Mustela americana (Turton). Eastern Marten.

Common up to timber line.

Lutreola vison (Schreber). Mink.

Mink are common and range up to timber line. On August 26, I caught an adult specimen at an altitude of 3200 feet, 1700 feet above, and five miles beyond, the upper limit of fish-inhabited waters. Heavy rains had filled a usually dry water course in the upper part of the middle basin, and he had probably followed this up.

Putorius cicognani (Bonaparte). Small Brown Weasel.

Very common in the woods in the south basin, and occurring at all altitudes. I caught one on the tableland in a caribou runway leading to a spring, and three at Chimney Pond. All these specimens are peculiar in the deep rich yellow of the under parts, which varies from sulphur to rich saffron, differing thereby from all the specimens that I examined in the Biological Survey and American Museum Collections.

? Mephitis mephitis (Schreber). Skunk.

Very common along the streams, where they are said to be increasing rapidly.

Procyon lotor (Linn.). Raccoon.

Common along streams at the lower levels.

Ursus americanus (Pallas). Black Bear.

Still quite common. Several are killed each year.

Condylura cristata (Linn.). Star-nosed Mole.

Two specimens were caught in the grassy clearing of my base camp, at 500 feet, but no signs of them were observed elsewhere.

Blarina brevicauda (Say). Short-tailed Shrew.

The short-tailed shrew is by far the most abundant mammal near Katahdin. In the clearing around the base camp, and in the adjacent woods they swarm. I caught one in my hands in some diapensia turf just below the edge of the tableland, and trapped one on the tableland at 4500 feet. They seem to take oatmeal bait as readily as flesh.

Sorex albibarbis (Cope.). Water Shrew.

Two specimens of this rather scarce shrew were caught, one at 2400 feet, the other at 3000 feet, but assiduous trapping failed to secure others. A comparison of the two with the type in the National Museum shows them to be perfectly typical.

Sorex personatus (I. Geoffroy). Northern Masked Shrew.

One specimen was secured near a spring in the fir scrub on the tableland at 4500 feet.

Conclusions.

That the flora of the north basin of Katahdin, of the slopes above timber line, and of the tableland is Hudsonian is evident from the occurence there of such plants as *Savastana alpina*, *Phleum alpinum*, *Poa laxa*, *Carex bigelovii*, *Scirpus cæspitosus*, *Juncus trifidus*, *Salix uva-ursi*, *Salix herbacea*, *Polygonum viviparum*, *Arenaria groenlandica*, *Cardamine bellidifolia*, *Saxifraga comosa*, *Empetrum nigrum*, *Betula glandulosa*, *Rhododendron lapponicum*, *Chamæcistus procumbens*, *Cassiope hypnoides*, *Phyllodoce cærulea*, *Mairania alpina*, *Vaccinium uliginosum*, *Vaccinium caespitosum*, *Diapensia lapponica*, *Veronica alpina*, *Nabalus nanus*, *Nabalus boottii*, *Solidago alpestris*, *Gnaphalium supinum*, all of which were recorded by the New England Botanical Club party of July, 1900 (Rhodora, Vol. 3, No. 30, January 1901), and many of these are rather Arctic than Hudsonian.

From the species of mammals found it is evident that the entire Katahdin region is covered by the Canadian mammalian fauna, with the possible exception of *Synaptomys sphagnicola* Preble. The first recorded specimen of this species was taken in the Canadian zone near the foot of Mt. Washington, the second and third, the only others, in territory that so far as altitude and temperature are concerned should surely be considered as Hudsonian. From the evidence at hand—the occurence of this animal with Hudsonian plants, with indications of a colony of some size, at a very recent date, and its absence from surrounding Canadian territory—it seems probable that it is a Hudsonian form, and that it occured in the lower zone on Mt. Washington, as Mr. Preble has suggested, a wanderer from its native belt.

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PROCEEDINGS

OF THE

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EIGHT NEW MAMMALS FROM THE UNITED STATES.

BY C. HART MERRIAM.

Among the recent additions to the mammal collection of the Biological Survey are a cougar from the desert region bordering the Lower Colorado, below Yuma, Arizona, presented by Herbert Brown; and a large gray fox from New Hampshire, presented by Abbott H. Thayer. Both of these animals appear to be new. In publishing brief diagnoses of them, the opportunity is taken to describe several other unnamed mammals that have been for some years in the collection of the Biological Survey.

Felis aztecus browni subsp. nov.

Type from Lower Colorado River 12 miles south of Yuma, Arizona. No. 125,719 ♂ ad., U. S. National Museum, Biological Survey Collection. February, 1903. Collected by Herbert Brown.

Characters.—Similar to *aztecus* but slightly smaller and paler, with much smaller and lower audital bullæ, and smaller lateral teeth, particularly the canines and carnassials. The incisors are the same size as in *aztecus*, but the canines are much more slender, and the premolars (except the rudimentary upper one) and carnassials are very much smaller. The upper carnassial measures only 20.5 mm., while in *aztecus* of the same sex (♂) it measures 24 mm. The bullæ are essentially of the same length as in *aztecus* but are narrow and low, lacking the usual inflation.

They measure in transverse diameter, from meatus to front of foramen lacerum posticus, only 16 mm., while those of *aztecus* usually measure 20 mm. or more. The difference in height is equally striking. In color the animal is very much paler and grayer (less red) than *aztecus.*

Remarks.—The small size of the bullæ seems to indicate that the Colorado Desert Cougar finds his prey more by sight than hearing; and the slender canines and small lateral teeth indicate that he preys on smaller animals than the deer-killing Cougar of the uplands.

Measurements (in flesh).—"Tip of nose to tip of tail 7 ft. 4 in.; tail 28½ in. Weight 170 pounds."

Urocyon cinereoargenteus borealis subsp. nov.

Type from Marlboro, 7 miles from Monadnock, New Hampshire. No. 119,725 ♂ ad., U. S. National Museum, Biological Survey Collection. November, 1902. Abbott H. Thayer.

Characters.—Similar to *cinereoargenteus* but decidedly larger, with marked skull and tooth differences. Skull larger and heavier; nasals longer and more slender posteriorly; palate broader; pterygoid fossa much broader, with sides more flaring (less vertical); teeth (particularly the upper molars and last lower premolar, pm $_{\overline{4}}$) slightly larger and decidedly thicker; last upper molar conspicuously larger (outer side 10 mm.), with heel broader and heavier. The 4th lower premolar is larger than in any known member of the genus.

Cranial measurements.—(Type specimen ♂ ad.): Basal length 126; basilar length of Hensel 118.5; zygomatic breadth 73; palatal length 63; postpalatal length 55; front of canine to back of last upper molar 56.

Urocyon catalinæ sp. nov.

Type from Catalina Island, Santa Barbara Islands, California. No. 45,228 ♂ ad., U. S. National Museum, Biological Survey Collection.

Geographic distribution.—Catalina Island, California.

Characters.—Similar to *littoralis*, but tail much longer, throat purer white; white of underside of thigh and upper side of hind foot greatly restricted; dusky patch at base of whiskers well defined.

Cranial characters.—Skull similar to that of *littoralis*, but nasals narrower and not constricted in the middle; rostrum longer and more slender; anterior ascending arm of jugal thicker; bullæ more inflated and less flattened anteriorly. *Urocyon catalinæ* agrees with *littoralis* and differs from all the others in having the nasals broad posteriorly and obliquely truncate, and the frontal spines short.

Measurements.—Male: Total length 795; tail 298; hind foot 112. Female: total length 720; tail 270; hind foot 112. Two specimens weighed in the flesh: ♂ 5 lbs.; ♀ 4½ lbs.

Urocyon clementæ sp. nov.

Type from San Clemente Island, Santa Barbara Islands, California. No. 92,034 ♂ ad., U. S. National Museum, Biological Survey Collection.

Geographic distribution.—San Clemente Island, California.

Characters.—Similar to *littoralis*, but dusky patch at base of whiskers much blacker and more sharply defined, with a clean white area between it and base of nose-pad, as in *santacruzæ*; throat clearer white; underside of thigh and upperside of hind foot whitish, in some cases nearly pure white.

Cranial characters.—Skull similar to *littoralis*, but smaller; nasals more tapering posteriorly and broadest in the middle (instead of constricted in the middle); rostrum more slender; frontal spines rather long; anterior ascending arm of jugal very broad; bullæ smaller and more inflated; upper carnassial narrower. *U. clementæ* differs from *catalinæ*, its neighbor in the southern group, as follows: size smaller; nasals broader in the middle and more tapering posteriorly; bullæ more inflated (especially anteriorly); carnassial and molar teeth smaller.

Measurements.—Average of 6 specimens: total length 688; tail 250; hind foot in dry skin 100.

Urocyon littoralis santacruzæ subsp. nov.

Type from Santa Cruz Island, Santa Barbara Islands, California. No. $\frac{34852}{47117}$ ♀ ad., U. S. National Museum, Biological Survey Collection.

Geographic distribution.—Santa Cruz Island, California.

Characters.—Similar to *littoralis*, but fulvous areas slightly more extensive and more intense; dusky patch at base of whiskers larger and darker; whitish area on underside of thigh and top of hind foot suffused with buffy fulvous; nasals slender and tapering posteriorly.

Cranial characters.—Similar to *littoralis*, but skull slightly smaller; nasals much narrower, slender and tapering (instead of expanded) posteriorly, and not constricted in the middle; frontal spines long; rostrum narrower; anterior ascending arm of jugal broader; bullæ smaller, more inflated posteriorly, narrower anteriorly; basioccipital narrower; upper carnassial narrower.

Measurements.—Average of 3 specimens: total length 708; tail 266; hind foot 109.

Cranial measurements of Island Foxes.

	littoralis	*santacruzæ*		*clementæ*		*catalinæ*	
	♀ ad.	♂	♀	♂	♀	♂	♀
Basilar length.	93.5	96	90	94	91	98	95
Palatal length.	49	53	49	50	48	53	50
Postpalatal length.	44	43.5	40.5	43.5	43.5	45	44.5
Zygomatic breadth.	57	57.5	55	56.5	55.5	60	57.5
Breadth of nasals at apex of premaxillæ.	7	5.5	5.5	7.5	7	6.5	7
Upper series of teeth (canine to last molar).	43.5	44.5	43	45.5	44	47	44

Putorius streatori leptus subsp. nov.

Type from Silverton, Colorado. No. 56,800 ♂ yg. ad., U. S. National Museum, Biological Survey Collection. October 20, 1893. J. Alden Loring. Original No. 1185.

Characters.—Similar to *streatori* but smaller; *black tip of tail very much shorter* (projecting only 15 mm. beyond white hairs): Teeth about same size as in *streatori*, but skull disproportionally smaller; frontals and rostrum more depressed; bullæ smaller and narrower.

Winter pelage.—White all over except short black tip of tail. White without yellowish tinge. (Two males from Colorado—the type from Silverton, and another from Crested Butte collected February 17, 1902 by E. R. Warren).

Summer pelage.—Upperparts uniform drab brown (or between drab brown and hazel, but lacking the reddish of hazel); end of tail black; underparts white throughout with straight line of demarcation along sides, the white reaching down on underside of legs to wrists and ankles; rest of legs and feet brown like back; toes of forefeet white on upper side; toes of hind feet mixed brown and white. (Young female from Rocky Mountains of Alberta, Canada, near Henry House, July 21, 1896, J. Alden Loring).

Remarks.—The animal is nearly as small as *rixosus*, from which it is easily distinguished by the longer tail and black tip, and slightly larger skull and teeth.

Measurements.—Type specimen (♂ yg. ad.): total length 243; tail vertebræ 64; hind foot 31. Skull: basal length 31.5; basilar length of hensel 30.5; zygomatic breadth 17.5; interorbital breadth 7.5; palatal length 13; postpalatal length 18; toothrow from front of canine to back of last molar 9.

Eutamias canicaudus sp. nov.

Type from Spokane, State of Washington. No. $\frac{27007}{34428}$ ♀ ad., U. S. National Museum, Biological Survey Collection. April 11, 1891. C. P. Streator. Original No. 639.

Characters.—Size rather large; ears medium or rather small; tail rather long; general color in spring pelage buffy gray, tail grizzled gray —decidedly grayer (less red) than in neighboring species; outer pair of light stripes strikingly white.

Color.—Spring pelage (=left over winter pelage): upperparts, including middle pair of light stripes vinaceous gray, with enough admixture of white-tipped hairs to produce a hoary effect; median, dorsal and lateral pair of black stripes (5 in all) pure black, the outer pair slightly washed with fulvous; upperside of tail grizzled gray, edged with whitish; underside with a median buffy band bordered with black and edged with whitish. Post-breeding pelage: neck, sides and edges of stripes washed with ochraceous or light fulvous.

Remarks.—This handsome new species with showy white side stripe is at all seasons easily distinguished from its neighbors, *felix* and *affinis* by the color of the tail, the general tone of which is gray. Both of the others have strikingly *red* tails, the underside and edges being intense fulvous or ferruginous. The geographic range of the gray-tail chipmunk so far as now known is the ponderosa pine forest of the Transition zone in northern Idaho and the adjoining eastern edge of the State of Washington.

Measurements.—Type (♀ ad.): total length 228; tail vertebræ 98; hind foot 32. Average of 6 adults from type locality: total length 229; tail vertebræ 104; hind foot 34.

Citellus grammurus utah subsp. nov.

Type from foot of Wasatch Mountains near Ogden, Utah. No. $\frac{4767}{5427}$ ♀ ad., Merriam Collection. October 10, 1888. Vernon Bailey. Original No. 291.

Characters.—Similar to *grammurus* but smaller, ears larger, back much redder; head in late summer pelage much more reddish brown; tail darker; nasal bones anteriorly averaging broader, more inflated and more truncate; also slightly longer and projecting posteriorly behind premaxillæ; fronts of incisors paler yellow (in *grammurus* more orange).

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FOUR NEW MAMMALS, INCLUDING A NEW GENUS (*TEANOPUS*), FROM MEXICO.

BY C. HART MERRIAM.

E. W. Nelson, and his able assistant E. A. Goldman, in their explorations in Mexico for the Biological Survey of the U. S. Department of Agriculture, still continue to discover new species of mammals. Four of these are here described. One is a large ground squirrel quite unlike any hitherto known; another is a wood rat for which I am reluctantly obliged to erect a new genus; still another is a new member of the rare and little known genus *Nelsonia*, while the last is a large pocket gopher from Mt. Patamban.

Citellus adocetus sp. nov.

Type from La Salada, 40 miles south of Uruapan, Michoacan, Mexico. No. 126,129 ♀ ad., U. S. National Museum, Biological Survey Collection. March 17, 1903. E. W. Nelson and E. A. Goldman. Original No. 16,183.

Characters.—Unique; not like any known species. Allied to *Citellus annulatus* but much smaller and without trace of the rings on the tail. Pelage hispid; ears short; tail rather long; color uniform grizzled grayish or buffy without markings.

Color.—Upper parts strongly grizzled grayish and black, changing with season to dull ochraceous brown; top of head usually darker (in some specimens blackish); stripe from side of nose passing over eye pale buffy, sometimes washed with or bordered above by pale fulvous; short band under eye (rarely reaching to ear) buffy; cheeks grizzled, washed with fulvous; underparts buffy or yellowish buffy, sometimes becoming fulvous on throat and chin; fore legs and feet and hind feet dull pale fulvous, the fulvous, in the brown pelage, extending over thighs; sides of neck washed with fulvous; tail coarsely grizzled black and buffy, bordered on terminal half with subapical black band and edged with buffy fulvous; median line of distal half of underside usually pale fulvous.

Cranial characters.—Skull about the size of that of *Citellus mexicanus* but frontal region very much broader, anterior upper premolar decidedly smaller, and front of incisors intense chestnut instead of pale yellowish. Compared with its nearest relative, *C. annulatus*, the skull is only about three-fourths as large, rostrum fore-shortened, jugal broader, coronoid and angular processes of jaw longer; the bullæ are large, the frontal shield broad, the postorbital processes long and strongly decurved.

Measurements.—Type (♀ ad.): total length 350; tail vertebræ 156; hind foot 48. Average of 10 specimens from type locality: total length 341.6; tail vertebræ 158.7; hind foot 46.9.

Cranial measurements.—Topotype (♂ ad.): basal length 41; palatal length 24; postpalatal length 17; zygomatic breadth 26; interorbital breadth 13; length of tooth row on alveolus 8.25; on crowns 7.5.

Nelsonia goldmani sp. nov.

Type from Mt. Tancitaro, Michoacan, Mexico. No. 125,818 ♂ ad., U. S. National Museum, Biological Survey Collection. February 25, 1903. E. W. Nelson and E. A. Goldman. Original No. 16,021.

Characters.—Similar to *Nelsonia neotomodon* but darker and grayer (much less fulvous), and with hind feet dusky instead of white. Tail well haired toward and at tip, as in *neotomodon*.

Color.—Upperparts dark slate gray, lightly washed, especially on sides, with pale ochraceous; underparts white, the plumbeous underfur showing through. Tail dusky above, becoming gradually paler beneath —not sharply bicolor as in *N. neotomodon*. Young dark slate color, very different from the buffy grayish young of *N. neotomodon*.

Cranial characters.—Skull similar to that of *N. neotomodon* but more angular; flatter between orbits and over front of braincase; anterior base of zygoma with vertical lamella well marked, forming a spine when viewed from above [absent in *neotomodon*]; nasals narrower; rostrum more constricted at base by better defined antorbital fossa.

Measurements.—Average of 3 specimens from type locality: total length 248; tail vertebræ 122; hind foot 29.

Genus **Teanopus** nob.

Type, Teanopus phenax gen. et. sp. nov.

Characters.—Size of a middle-sized wood rat (*Neotoma*), which it greatly resembles, though externally still more like *Hodomys vetulus*; ears large and nearly naked; tail long and densely covered with short hairs; soles of fore and hind feet, between pads, completely scutellate —everywhere covered with small tubercles. Skull in general like that of *Neotoma* and *Teonoma*, but audital bullæ enormously inflated vertically, subwheel-shaped, blunt anteriorly, nearly parallel, almost exactly as in *Xenomys;* antorbital slits very large and broadly open; sphenoid vacuities open; braincase without temporal shield. Lower jaw with distinct prominence over root of incisor; angle elongate, its lower border *strongly inflected and upturned*, forming a long shallow trough as in *Teonoma*, but less extreme; infracondylar notch deeper than in either *Neotoma* or *Teonoma.* Last lower molar with reentrant enamel loop on inner side passing obliquely forward in front of its mate on outer side, thus approaching the condition in *Hodomys.*

Teanopus phenax sp. nov.

Type from Camoa, Rio Mayo, Sonora. No. 95,841 ♀ ad., U. S. National Museum, Biological Survey Collection. November 4, 1898. E. A. Goldman. Original No. 13,258.

Characters.—Size and general appearance of *Hodomys vetulus;* tail rather long and black or dusky all round; upperparts buffy gray; underparts yellowish white anteriorly, underfur showing through posteriorly; top and sides of nose dusky; cheeks pale grayish; outer side of foreleg to wrist grayish dusky, sharply contrasted with white of underside; hind foot soiled whitish above; ankles and sides of heel dusky on both sides, bordered with white below.

Dental characters.—Molars (except the last lower, described in the generic diagnosis) with enamel folds as in the *albigula* group of *Neotoma.*

Measurements.—Type specimen, ♀ ad.: total length 352; tail vertebræ 172; hind foot 37.5. Average of 3 from type locality: total length 365; tail vertebræ 183; hind foot 37.7.

Platygeomys tylorhinus angustirostris subsp. nov.

Type from Patamban, Michoacan, Mexico. No. 125,688 ♀ ad., U. S. National Museum, Biological Survey Collection. February 2, 1903. Nelson and Goldman. Original No. 15,850.

Characters.—Similar in size and general characters to *P. tylorhinus* but color paler and more fulvous, grizzled on back with black-tipped hairs; slaty plumbeous of underparts much paler and washed on tips with pale fulvous. Skull slightly smaller; rostrum, nasals, and incisors decidedly narrower; nasals narrow and strongly arched anteriorly; the posterior half very narrow and of even breadth (sides parallel for posterior half); jugal and pterygoids as in *tylorhinus;* molars smaller. Underjaw much smaller.

Cranial measurements.—Skull of type specimen: basal length 53.5; zygomatic breadth anteriorly 38; breadth of rostrum anteriorly 10; breadth of nasals anteriorly 6; at middle 3. The flesh measurements have not yet come in from the field.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE SHORT-MOUTHED SNAKE (*EUTAINIA BRACHYSTOMA* COPE) IN SOUTHERN MICHIGAN.

BY HUBERT LYMAN CLARK.

In 1892, Cope described, under the name *Eutainia brachystoma*, a small garter-snake from Franklin County, Pennsylvania, which had been sent to him in alcohol, the distinguishing feature being the small number of labial plates in both the upper and under jaws. Since the description was published no other specimens have been taken and the validity of the species has been openly questioned. It is therefore a matter of considerable interest that the species has been found in the vicinity of Olivet, Michigan, on several occasions, during the spring of 1903. The first specimens taken were a male and female collected April 20, beside a rail fence crossing an open but very wet pasture. The fence ran close beside a pool of water where there was a growth of willow and alder bushes, and it was under the shelter of these bushes that the snakes were found. On April 23, careful search in the same locality revealed a second female and April 29, another female was taken at the same spot. On May 7, still another female was captured beside the same fence but some sixty yards from the bushes. On May 12, a fifth female was taken in a very wet swamp on the margin of a lake, half a mile or more from the above mentioned pasture.

The following table will bring out clearly the characters of the species and the individual peculiarities of the Olivet specimens:

Number	Date	Sex	Length (mm.)	Gastrosteges	Urosteges	Upper Labials R—L	Lower Labials R—L	Postoculars R—L
Cope's type.	1892	♂	286	132	72	6—6	8—8	3—3
1	April 20, 1903	♂	472	135½	61	6—6	8—8	3—3
2	April 20	♀	556	133½	58	6—6	8—8	2—2
3	April 23	♀	485+	137	?	6—6	8—8	2—2
4	April 29	♀	420	136	52	6—6	8—9	2—3
5	May 7	♀	411	141	54	7—7	8—8	2—2
6	May 12	♀	460	140	58	6—6	8—8	3—3

It will be noticed at once that only one of the five females is perfectly normal, all of the others having a reduced number of postocular plates. It is also apparent that the type specimen is not an average representative of the species, since the number of gastrosteges is exceptionally small, while the number of urosteges is unusually large. In Nos. 1 and 2 there were incomplete gastrosteges, which have been counted as half plates. In No. 3, nearly one-half of the tail was missing, so that the urosteges could not be determined.

The new material makes it possible to state more definitely the specific characters, and to correct one or two of Cope's misstatements, which were due to his having only one specimen, and that an alcoholic. In general appearance, the short-mouthed snake is somewhat like the common garter snake (*Eutania sirtalis*) but the head is so much narrower and the tail tapers so much more abruptly that even a very casual glance will suffice to note the difference. In coloration, moreover, there is a very striking difference between the two species, as indicated by Cope, but his description of the color of *brachystoma* is very misleading, owing to the changes produced by the alcohol. In life, *brachystoma* is very dark brown above, many of the scales being almost black, as are portions of the skin; in some specimens, when the skin is stretched, these black areas appear as a more or less complete double series of squarish spots on each side of the dorsal region; the mid-dorsal row of scales and the inner half of the scales in the row on each side of it are bright yellow anteriorly, gradually becoming duller posteriorly and losing their distinctness on the tail; a similar stripe occurs on each side of the body and includes all the scales of the third row, the lower half of most of those in the fourth row and the upper half of many in the second row; these lateral stripes fade away on the tail but are very bright anteriorly, where they expand so that the entire sides of the neck are very yellow; on this yellow area are several prominent black spots; the first row of scales and the outer ends of the gastrosteges are deep brown, the latter with a dusky yellowish tinge; the ventral surface is dull light olivaceous, darkest near vent, sparsely speckled with black (the exact shade varies considerably, No. 6 having the whole lower surface dark, becoming almost black in front of vent); there is a narrow black spot on the anterior margin of the outer end of the gastrosteges; the head is brown, with a greenish tinge anteriorly; labials yellow, chin white and throat yellowish; parietal spots yellow, very evident. Gastrosteges 132–141 (average 136+); urosteges 61–72 in ♂, 52–58 in ♀; upper labials 6; lower labials 8; postoculars 3; scale rows 19.

The question which naturally arises is: What is the relation of *brachystoma* to *sirtalis?* Had Cope's type remained unique, it might well have been regarded as a sport, merely an unusually aberrant *sirtalis*, and the discovery of a single specimen in Olivet or elsewhere would not necessarily have disproved the correctness of this view. But in the light of the evidence furnished by six specimens of both sexes, taken at various times in several places, such a view is certainly incorrect and there can be no doubt of the distinctness of the two species. The difference in color is constant, in spite of the extraordinary variety shown by *sirtalis;* in the latter the lateral stripes are mainly on the second, partly on the third, row of scales instead of on the third and fourth as in *brachystoma;* while the deep brown band below these stripes is wanting in *sirtalis.* The difference in form is equally noticeable, though less easily stated; *brachystoma* is more stocky and tapers towards both ends rather abruptly. As regards the number and arrangement of scales, the two species are equally distinct, although individuals occur combining the characters curiously. Thus No. 5 has 7 upper labials on each side, the normal number for *sirtalis*, while No. 4 has 9 lower labials on the left side; out of 320 specimens of *sirtalis* examined this spring, 6 have 6 upper labials on one side but none have that number on both sides, while 12 have 8 upper labials on one side, and 2 have that number on both sides; as regards the lower labials, 268 of the 320 have the lower labials 10 on each side, 9 have 9 on each side, 4 have 11 on each side, and 2 have only 8 on each side, while the remainder have 9 or 11 on one side or the other, except 3 which have 8 on one side. The most interesting case in this connection is a small male *sirtalis*, which has the upper labials 6–7 and the lower 8–8; however, as it has 152 gastrosteges and 75 urosteges and is a perfectly normal *sirtalis* in coloration, it cannot be regarded as in any sense a connecting link with *brachystoma.* In the number of gastrosteges the difference between the two species is striking, *brachystoma* ranging from 132 to 141, with an average of about 136, while the 320 specimens of *sirtalis* range from 142 to 159 and average about 151; and it should be added that of the 320, only one has 142, two have 143, and two 144 gastrosteges. In the number of urosteges the two recorded male *brachystoma* are far apart, 61 and 72, an average of less than 67, but male *sirtalis* range from 64 to 79, with an average of more than 71, and further, only 9 of 163 specimens have less than 67 urosteges; the female *brachystoma* range from 52 to 58 with an average of more than 55, while female *sirtalis* range from 57 to 73, with an average of more than 63, and only 4 out of 157 have less than 59. Cope's statement that "the number of urosteges remains as in" *sirtalis* requires, therefore, some modification, as it is clear that the number is normally decidedly less than in the common garter-snake.

In regard to the habits of *brachystoma*, Cope's statement that "it is one of the forms * * * which * * * have adopted a terrestrial life and more or less burrowing habits" is open to question. Though not aquatic, this species likes the water and has been found only in its immediate neighborhood. Several specimens have been kept alive, under as natural conditions as possible, and they show considerable readiness to take to the water when alarmed, nor is there any evidence of burrowing or of retreating to holes. Indeed the habits are very much like those of the common garter-snake, except that *brachystoma* is not at all pugnacious, making no attempt to strike when seized or handled.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTION OF A NEW *NEOTOMA* FROM MEXICO.

BY OUTRAM BANGS.

The collection of mammals made in Mexico by Mr. S. N. Rhoads and his wife, in the winter and spring of 1899, was purchased soon afterwards by my brother and myself, and is now in the Museum of Comparative Zoology, at Cambridge, Mass. When identifying the species, a year or two ago, I was much puzzled by a *Neotoma* from Texolo, Vera Cruz, that I could not place with any described form, and showed it to Mr. E. W. Nelson, who at once declared it a species he had never taken or even seen, and suggested I send it to Dr. Merriam for comparison with the series in the Biological Survey Collection. This I accordingly did, and Dr. Merriam has most kindly compared it for me with all known forms to which it might be related, and pronounces it a very distinct species, with, apparently, no near ally among the known members of the genus. This new *Neotoma*, of which Mr. Rhoads took five examples, all at the same place, may be known as:

Neotoma distincta sp. nov.

Type from Texolo, Vera Cruz, Mexico. Old adult ♂ No. 9819, Bangs Collection. (Collection Museum of Comparative Zoology.) Collected March 8, 1899, by S. N. Rhoads.

Characters.—A very distinct species, with a wholly black tail as in *N. tenuicauda*, but much larger than that animal, and differing from it markedly in skull characters; much like *N. fulviventer* in color, except the tail, which is bicolor in that species, but rather darker; much larger than *N. fulviventer* and with a much larger and more massive skull; rostrum and nasals longer; rostrum more swollen over roots of incisors; antorbital fossa correspondingly more pronounced; zygomata more spreading posteriorly (in *N. fulviventer* the sides are parallel); superciliary ridges more elevated and more pinched in over orbits; incisors and molars much larger and heavier.

Color.—General color of upperparts mummy brown, the back much darkened by the thick sprinkling of brownish-black tipped hairs; sides paler, more russet; sides of nose and upper lips dull grayish brown; chin, upper throat and narrow belly stripe dull gray; a wide pectoral collar, ochraceous-buff; lower middle belly and ventral region yellowish white; feet and hands dull grayish brown; toes and fingers white; ears rather small, nearly naked, dusky; tail unicolor, black; whiskers mixed black and colorless.

Measurements.

No.		Sex	Total length	Tail vert.	Hind foot	Ear
9819	Type	♂ old ad.	417	206	41	23
9818	Topotype	♂ old ad.	370	165	41	23
9821	Topotype	♂ old ad.	395	185	40	26
9820	Topotype	♀ ad.	377	190	40	20
9822	Topotype	♂ young ad.	370	165	41	23

Skull, old adult ♂, type: basal length, 43; occipito-nasal length, 48; zygomatic width, 25; mastoid width, 19.4; interorbital width, 5.2; length of nasals, 19; width of nasals, 5.6; length of palate to palatal notch, 22.2; length of palatal slits, 10.6; length of upper molar series, 9.4; length of single half of mandible, 29.6.

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PROCEEDINGS

OF THE

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THE HAWTHORNS OF NORTHEASTERN WISCONSIN.

BY J. H. SCHUETTE.

The genus *Crataegus* is variable and has always given trouble to field botanists. As a result of deficient material and imperfect observations there is a confused treatment, even in leading manuals, and this may be the cause of the excessive splitting of species in recent years. There are six distinct species or rather groups in northeastern Wisconsin each including forms which are not entitled to specific rank although exhibiting some constant differences. These variant forms should be considered only as subspecies. Hawthorns, like roses, willows, oaks and many other woody plants furnish valuable material for research to evolutionists, who have hitherto turned their attention chiefly to the animal kingdom. The variability and polymorphism are due to the influence of the evironment and soil, the climate, effects of age and injury, crossing, and progressive heredity. In the region of Green Bay, where the retiring waters of bay and lake left distinct evidences of former higher levels in Pleistocene and Recent geological time, variation due to changed environment is illustrated especially by the wild roses. Thus individuals growing on the younger formations of moist and wet sand, or near the surf, present characters plainly different from those of others of the same species growing on the higher alluvial or Pleistocene ridges. *Crataegus* like *Rosa* is very susceptible to such influences. Therefore no expert author should venture to base a new species on a single specimen or a single or slight character. The definitive characters should be constant and direct. Our attention is first of all attracted by the external differences in plants. Form, aspect, and habit, therefore, are all important in the discrimination of variations and in the elevation of subspecies to species, at least for popular recognition. Plants like the hawthorns require observation and investigation under different conditions of environment before being subjected to further specific or subspecific differentiation.

After hunting for years for *Crataegus crus-galli* I found on the peninsula between Lake Michigan and Green Bay, on Washington Island, the next island north of Death Door, Wisconsin, a group of nice trees with shining, thick leaves and rather long thorns. I believed I had at length found the desired species or a variety of it, but later discovering my mistake I called this form *C. punctata decipiens*, and reached the conclusion that *C. crus-galli* does not occur in our northwest. This view is supported by a specimen received in exchange from the National Herbarium labelled "*Crataegus crus-galli*" and collected in Minnesota. Although I have not seen the buds and fruits I regard it as *C. tomentosa.* The error, due to the meagre and misleading descriptions given in current manuals, is very excusable.

Finally, mention should be made of some interesting observations on the effects of the cold and moist atmosphere near Lake Michigan. At the outset the entire vegetation on the peninsula between Green Bay and the lake is delayed 3 or 4 weeks as compared with that of the surrounding region. Secondly, the atmospheric conditions due to the proximity of the water appear to produce variations and freaks in species, even shrubs seeming to be changed into trees. Near Kewaunee, Wisconsin, on an elevated plain, I met with a cluster of trees, each about 30 feet high and 10 inches in diameter, with the characters of *Acer spicatum*, the well known shrub. All but one of these trees have since been exterminated by clearing. On the southern grassy slope of this plain is a little grove of *Crataegus* trees, 12–18 feet high and 3–5 inches in diameter. I am, however not certain as to their specific identity since I have not seen the buds and flowers.

Since the nomenclature of *Crataegus* seems to be somewhat unsettled, I have employed the familiar names while embodying my own views in the following descriptions. A series of specimens, including the types of the new forms, has been presented to the Biological Society of Washington, and by the latter turned over to the United States National Museum.

Artificial Key to the Hawthorns of Northeastern Wisconsin.

I. Fertile shoots of the current season pubescent.
  1. Leaves cordate, truncate or rounded at base, tomentose beneath; petioles not margined, tomentose 1. *C. subvillosa* Schrader.
  2. Leaves acute or acuminate at base; petioles margined.
    a. Sepals (calyx lobes) toothed (glandular in No. 3).
      * Anthers red; petioles and outer surface of sepals pubescent; flowering two weeks later than No. 1 2. *C. tomentosa* L.
      ** Anthers white; sepals glabrous outside (sometimes hairy at base) - - 3. *C. macracantha* Lodd.
    b. Sepals entire, glandless, their outer surface glabrous in the upper half - - - - 4. *C. punctata* Jacq.

II. Fertile shoots of the current season glabrous.
  1. Corymb and calyx pubescent; sepals deeply (almost fimbriately) toothed; petioles not more than one-sixth as long as the blade, margined, groove hairy and impressed.
    a. Anthers red; stamens 12-20; calyx cup hairy; leaves hairy beneath, especially on the nerves 5. *C. pyrifolia* Ait.
    b. Anthers white in bud, gradually turning brown; stamens 8-12 (rarely more), calyx cup and leaves beneath usually glabrous - - 6. *C. pyrifolia sylvestris* subsp. nov.
  2. Corymb and calyx cup glabrous*; sepals slightly dentate or entire; petioles at least one-third as long as the blade, glabrous beset with few glands.
    a. Anthers white; sepals toothed and conspicuously glandular; petioles margined, blade acute at base, its teeth more or less obtuse if the small terminal gland is removed - - - - 7. *C. caliciglabra* sp. nov.
    b. Anthers red; sepals with few gland-tipped teeth or entire and glandless; petioles marginless by tightly inrolled edges, filiform, usually more than one-half as long as the blade - - - - - - 8. *C. coccinea* L.
    (For subspecies see below, description No. 8).

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* In some forms of *C. coccinea* slightly scattered with soft hairs, but glabrate.

Descriptions of species and subspecies.

1. Crataegus subvillosa Schrader.

A tree with gray, ascending branches, 20–30 feet high and 6–9 inches in diameter. It is easily distinguished by the generally large, densely villous-tomentose leaves with mostly cordate, truncate or even acute bases and slender marginless petioles. The corymbs and flowers are large; sepals hairy both within and without, teeth and glands none or obscure; stamens 12-20 with whitish, later brownish, anthers; the disk with mostly 3-4 styles. The dull red fruits vary in size up to that of cherries and are globose, ovoid or obconical. Thorns few, black, slender, or short and stout. Flowering in the second half of May. Not rare; on banks, slopes, and in moist soil.

2. Crataegus tomentosa L.

A slender, crookedly bent but upright, gray tree with few short branches, 8–10 feet high and as thick as a heavy walking stick. The leaves are ovate or obovate (often somewhat oblong or roundish), acute at top, acute or acuminate at base, the blade decurrent on the short, tomentose petiole almost to the end; marginal teeth cuspidately tipped, the blade pubescent beneath, glabrous above; the bracts of the buds are large and red, of the flowers linear-lanceolate, brownish, obscurely toothed and glandless. The compound corymb, the calyx cup, and the usually irregularly toothed and glandless or minutely glandular sepals are finely tomentose. Stamens 12-20; anthers red; pistils 2 or 3; fruits small, somewhat pear-shaped, oblong when young, bulged at the middle like a cask, and quite red when ripe. Not rare in fertile soil or clay, which it prefers. It is unmistakably distinct and easily recognized by its late flowering, about June 10–25, two weeks later than the species last described.

3. Crataegus macracantha Lodd.

This species is distinguishable from the last by the white anthers. It is a thorny, spreading, gray shrub, 6–10 feet high. Leaves generally round-ovate, acute or acutish at each end, obscurely lobed and toothed (teeth tipped with a small gland, obtuse or obtusish if this gland is removed), hairy beneath; petiole usually rather slender, mostly with few glands, margined and hairy. Bud scales reddish; stipules and bracts lance-linear, quite glandular; corymbs compound, hairy, as are the calyx cups; sepals glabrous outside, toothed, and glandular on the short teeth. Stamens 8-10; pistils 4 (3-5); fruits red, ovoid or globose, as large as big peas. Thorns dark brown, shining, rather long and numerous, as are the flowers and fruits. Flowering the latter half of May. Common. Prefers moist soil on banks and slopes (Compare No. 7, below).

4. **Crataegus punctata** Jacq.

A large shrub or usually a small tree, 12–25 feet high and 4–6 inches in diameter, with numerous, nearly horizontal, far-spreading, gray branches and few gray, slender thorns. Leaves obovate to spatulate, acute at apex, cuneate at base, decurrent on the hairy or tomentose, short petiole (in some forms the latter only margined), entire in the lower, irregularly toothed in the upper part, the teeth obscurely glandular or glandless, the nerves hairy underneath. Bud scales brown, but involucral leaves rather large, obovate or spatulate, greenish, brown, or whitish. Stipules and bracts chiefly linear, slender, brown and glandular on the margins, of various forms in sterile shoots. Corymbs compound, with profuse, large flowers. Calyx cup densely hairy or tomentose; sepals entire and glandless, glabrous outside in the upper half. Stamens 12-20; anthers at first whitish, later brown and dark; pistils 3; fruits usually large, globose, reddish or yellowish-green with whitish dots. This conspicuous tree with a handsome top is densely covered with white flowers at the end of May and the early part of June. It prefers calcareous and open clay-soil pastures. Common, especially on the peninsula between Lake Michigan and Green Bay.

Variations from the type are occasionally observed in the form and size of the leaves, the sepals, the glands, degree of pubescence, etc. The variety with shining, thick leaves and with more numerous, rather larger thorns is *C. punctata decipiens* subsp. nov. (type specimen, No. 431,497, U. S. National Herbarium), *C. crus-galli* is not found in the region under consideration.

5. **Crataegus pyrifolia** Ait.

A tree with gray ascending branches forming a rather close, somewhat obtuse top. Shoots of the preceding season brown and shining, those of the current year green, later brown; bud scales coriaceous, brown; involucral leaves obovate to spatulate, red with a green zone along the margins, glandular; stipules and bracts very fugaceous, mostly filiform or linear, and glandular; leaves broadly elliptic but acute at each end (or ovate or obovate), dull, hairy on the nerves on both faces, the pubescence extending down on the upper side of the longitudinal groove of the otherwise glabrous, glandless, margined, short petiole which rarely exceeds one-sixth the length of the blade; teeth of blade glandless or obscurely glandular. Corymb compound, pubescent; calyx cup hairy; sepals almost fimbriately toothed and glandular, glabrous outside; stamens usually 12 to 20; anthers red; pistils 2-3; fruits the size of peas, globose or globular, red. Thorns generally short and stout, straight, dark brown and shining, gray on older branches. Flowering toward the end of May. Not rare on rich and moist soil.

6. **Crataegus pyrifolia sylvestris** subsp. nov.

This plant, probably a woods-living form, is closely allied to the last. It is, however, distinguished by having usually 10 (7–12) stamens; anthers white becoming yellow, then brown; the sepals outside glabrous or nearly so, in general less hairy on the corymb; bracts narrowly lanceolate to linear or filiform; the petioles slightly longer, often one-fourth as long as the blade; the upper involucral leaves sometimes uniform whitish or approaching the last with greenish or yellowish margins, usually slender, longer, often bent, numerous on shrubs, fewer on trees. A slender tree (8–15 feet high) with slender branches, occurring not rarely in wet, moist, shady woods. Flowering with the last. Type specimen, No. 431,500, U. S. National Herbarium.

7. **Crataegus caliciglabra** sp. nov.

A low, spreading, thorny shrub on borders of open fields and in groves, similar in general to No. 3, but distinguished by the following characters: shoots of the current year glabrous; calyx, except the upper side of the sepals absolutely glabrous; the whole plant otherwise glabrous; the petiole obviously marked with 3-5 glands; the uppermost involucral leaves green with a reddish midnerve, spatulate; the lanceolate, slender sepals usually longer than the cup when flowering. This species is distinguished from *C. pyrifolia* and *C. coccinea* by its white anthers and the more obtuse teeth of the blade. Flowering with the last. Type specimen, No. 431,498, U. S. National Herbarium.

8. **Crataegus coccinea** L.

A polymorphous shrub, nearly every individual exhibiting some variation. The young plants vary from the old ones, the solitary individuals from those in groups. According to the environment characters disappear, are added, or fail to present a distinct appearance. For these reasons the following description includes several forms recently regarded as species.

The typical form is only a shrub, 3 to 10 feet high. The branches are gray, ascending, more or less divergent, roundish, striate or irregularly angular, and somewhat undulately-bent; the twigs yellowish or brownish; the fertile shoots of the season glabrous; the thorns short and stout or long and slender, brown (gray on old twigs), mostly black at top and brown-red below, sometimes with a slightly silver-gray cover; petioles filiform, slender, marginless, usually as long as or longer than half the length of the blade, beset with few glands. The blade is broad-ovate in outline, acute at the top, obscurely protracted at the cordate, truncate or rounded base, lower face soon glabrous, teeth sharply acute, slightly glandular-tipped or glandless. Bud scales obovate, red; stipules like the bracts linear to narrow-lanceolate, reddish or yellowish, soon deciduous, lined on the margins with brown or yellow glands. Corymbs compound, glabrous, sometimes thinly scattered with deciduous or fugaceous soft hairs. Calyx cup glabrous; sepals glabrous outside, slightly hairy or smooth inside, either with a few or more basal glandular teeth or entire and glandless. Stamens in some forms 12–20, usually not exceeding 12; anthers red; pistils 3–5; fruits ovoid, red, the size of large peas. Flowering from the end of May. Frequent on dry soil.

In the type, cordate and truncate leaves are prevalent; the sepals more or less toothed and glandular, hairy inside; the stamens rarely more than 12, and the thorns usually slender. *Crataegus coccinea eglandulosa* subsp. nov. (type specimen, No. 431,494, U. S. National Herbarium), on dry, exposed soil, has entire (or nearly so), glandless sepals, being glabrous within or obscurely hairy; usually 5–8 stamens; 3 or 4 styles; and usually stout and short thorns. *C. schuettei* Ashe, close to the type and perhaps only a variety, is distinguished by the toothed and glandular, ventrally hairy sepals, the mostly 12–20 stamens, the petioles with a deep, hairy, longitudinal groove. It is of slightly higher growth and prefers somewhat moist soil.

VOL. XVI, PP. 99-102 JUNE 25, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

GENERAL NOTES.

The proper name of the Redwood Chickaree.

In the Proceedings of the Biological Society of Washington (Vol. XI, pp. 281–282, December 30, 1897), I described as a new subspecies a form of *Sciurus* (*Tamiasciurus*) *douglasi*, that inhabits the costal strip of northern California west of the Coast Range, calling it *Sciurus hudsonicus orarius.* A few months later Dr. J. A. Allen published a review of the subgenus *Tamiasciurus** and to my astonishment substituted Audubon's and Bachman's name, *Sciurus mollipilosus* for this animal.

As I cannot agree with Dr. Allen on this point of synonymy, it seems well to point out why, in my opinion, the animal in question should be known by my name and not that of Audubon and Bachman.

Sciurus mollipilosus was first described by Audubon and Bachman in the Proc. Acad. of Nat. Sci., Phila., October, 1841, p. 102, from specimens said to have come from the "Northern parts of California." A little later the species was figured and again described in Quad. of N. Am., Vol. I, pp. 157–158, pl. XIX, by the same authors who changed the locality to "The northern part of California near the Pacific Ocean." The figure and both descriptions indicate an animal very rusty brown above and grayish below, the underparts being said to be "cinereous, lightly tinged in some places with rufous." The tail was described as "brown, twice annulated with black; a few of the hairs are tipped with gray." None of these characters agree in the least with the colors of the Redwood Chickaree, which is very dark and distinctly olivaceous above, without reddish brown shades, except sometimes a little at base of tail and on rump, and varies in color below from pale ochraceous-buff to strong ochraceous and has the tail deeply fringed with white at all seasons.

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*Bull. Amer. Mus. Nat. Hist., X, pp. 249–298, July 22, 1898.

True *Sciurus douglasi*, the nearest relative of *S. orarius*, was perfectly well known to the distinguished authors of the Quadrupeds of North America, having been, in fact, first described by Bachman himself, but they make no mention of their *Sciurus mollipilosus* being at all like it, comparing the latter with the eastern Chickaree, *S. hudsonicus.*

At the time I wrote my description it seemed to me so perfectly evident that *S. mollipilosus* was a member of the *hudsonicus* and not the *douglasi* group that I did not mention that species though I carefully compared specimens of the new form with the descriptions and the plate. Going over the ground again, even more carefully, I am still emphatically of the same opinion.

As to the origin of the specimens (there were said to be specimens) upon which the name *Sciurus mollipilosus* was based—the only ground Dr. Allen gives for using the name to supplant my *S. orarius*—a word is sufficient. When Audubon and Bachman knew the exact source of their material they always stated it in detail, and such, in those days, little-known and indefinate regions as "Northern parts of California" and "Northern part of California near the Pacific Ocean" means merely northwest coast of North America, and is analogous to "that part of California that adjoins Mexico" of the same authors.

To sum up: In my opinion *Sciurus mollipilosus* Audubon and Bachman may have been based on the animal now called *Sciurus hudsonicus vancouverensis* Allen, with which the plate and descriptions agree very closely, or possibly it may have been *Sciurus hudsonicus streatori*, but whatever it was, it was a member of the *hudsonicus* group and has nothing whatever to do with the Redwood Chickaree which belongs to the *douglasi* group, and should be known as *Sciurus* (*Tamiasciurus*) *douglasi orarius* (Bangs).—*Outram Bangs.*

A new name for the Dinosaur Haplocanthus Hatcher.

Dr. C. R. Eastman has very courteously called my attention to the fact that the generic name *Haplocanthus* recently proposed by me for a new Sauropod dinosaur from the Jurassic deposits near Canyon City, Colorado,* is essentially preoccupied, Agassiz having employed the name *Haplacanthus* for a genus of fishes. I would therefore propose the name *Haplocanthosaurus* for this genus of dinosaurs with simple median spines on the anterior dorsals and posterior cervicles.—*J. B. Hatcher.*

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*Proc. Biol. Soc., Washington, XVI, pp. 1–2, February 21, 1903.

Corrections to the nomenclature of the Eocene fossil corals of the United States.

Since the publication of my Eocene and Lower Oligocene coral faunas of the United States in 1900, as Monograph XXXIX of the U. S. Geological Survey, I find it necessary to make several changes in the names there used.

Aldrichiella nom. nov. for genus *Aldrichia* Vaughan (op. cit. p. 70). Professor T. D. A. Cockerell has called my attention to the fact that Coquilett applied this name in 1894* to a genus of Bombylid flies. Type species of *Aldrichiella*, *A. elegans* Vaughan.

Endopachys Lonsdale, 1845. My genus *Rhectopsammia* (op. cit. p. 183, pl. XXI, figs. 11–13) was based on the young of *Endopachys maclurei* (Lea), but I discovered my mistake after the publication of the Monograph. The genus *Endopachys* has been characterized as showing no evidence of attachment. My *Rhectopsammia* is the attached young of *Endopachys*. These young individuals often attain a height of 6 mm., then the upper portion of the corallum becomes separated from the pedicel. Indications of the detachment scar may frequently be seen quite late in the life of some specimens. Usually it is ultimately completely obliberated by the deposition of calcareous substance over it by the edge zone of the coral extending downward, enveloping the base.

It may be well to call attention to an apparent duplication of the name *Paracyathus granulosus*. On page 107, pl. VIII, figs. 15 to 15b, in my memoir already cited, I have described and figured a species from Woods Bluff, Alabama, under the name given above. Professor Verrill in the Rept. U. S. Fish Com., Pt. XI, in the Vol. for 1883, pub. 1885, p. 535. uses the name *Paracyathus granulosus*, but the name is not accompanied by any description. I have made a careful search for a published description of the species referred to, but have not been able to find any. I have written to Professor Verrill for information regarding the matter. He says that some *nomina nuda* escaped his attention in preparing the lists for the Fish Commission, although he endeavored to eliminate all of them. Therefore my name *Paracyathus granulosus* will stand, and when Professor Verrill publishes the description of his coral it will be necessary for him to give it another name.—*T. Wayland Vaughan.*

Note on the generic name Hylophilus.

The presently accepted rules of nomenclature render necessary the rejection of the generic term *Hylophilus* for the group of Vireonidæ to which it has been commonly applied. This name *Hylophilus* (Temminck, Pl. Col., 1823, pl. 173, fig. 2) is preoccupied by *Hylophila* Hübner (Verz. Schmett., 1816, p. 396), used for a genus of Lepidoptera. The proper name for the avian genus is *Pachysylvia* Bonaparte (Consp. Avium I, 1850, p. 309); and the following species are current:

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*Trans. Amer. Entomolog. Soc., Vol. XXI, p. 93, 1894.

Pachysylvia olivacea (Tschudi), *Pachysylvia flavipes* (Lafresnaye), *Pachysylvia viridiflava* (Lawrence), *Pachysylvia pallidifrons* (Dalmas), *Pachysylvia acuticauda* (Lawrence), *Pachysylvia griseipes* (Richmond), *Pachysylvia brunnea* (Allen), *Pachysylvia semicinerea* (Sclater and Salvin), *Pachysylvia luteifrons* (Sclater), *Pachysylvia ferrugineifrons* (Sclater), *Pachysylvia rubrifrons* (Sclater and Salvin), *Pachysylvia ochraceiceps* (Sclater), *Pachysylvia brunneiceps* (Sclater), *Pachysylvia aurantiifrons* (Lawrence), *Pachysylvia fuscicapilla* (Sclater and Salvin), *Pachysylvia flaviventris* (Cabanis), *Pachysylvia semibrunnea* (Lafresnaye), *Pachysylvia flaveola* (Wied), *Pachysylvia amaurocephala* (Nordmann), *Pachysylvia pœcilotis* (Temminck), *Pachysylvia sclateri* (Salvin and Godman), *Pachysylvia muscicapina* (Sclater and Salvin), *Pachysylvia decurtata* (Bonaparte), *Pachysylvia pectoralis* (Sclater), *Pachysylvia thoracica thoracica* (Temminck), *Pachysylvia thoracica griseiventris* (Berlepsch and Hartert).—*Harry C. Oberholser.*

The Short-leaved Sundew in Virginia.

During the second week of May, 1903, I found the short-leaved sundew common in a low moist field near the shore of Hampton Roads about three miles west of Hampton, Virginia. The situation was open, and rather less wet than those generally occupied by the more northern members of the genus, since the *Drosera* was closely associated with such plants as *Houstonia cœrulea* and *Potentilla canadensis* rather than with characteristic bog species. During the early hours of the day the plant was conspicuous on account of its large whitish flowers, exceeding in size those of either of its companions; but by noon the corollas closed, and the slender scapes and small rosettes of reddish leaves were not easily detected among the grass.

This record extends the northward range of *Drosera brevifolia* from southern North Carolina,* and adds another to the list of lower austral plants known to reach the region of the lower Chesapeake Bay.—*Gerrit S. Miller, Jr.*

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*See Kearney, Contrib. U. S. Nat. Herb., X, p. 454, August 1, 1900.

VOL. XVI, PP. 103-104 JUNE 25, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW LANDSHELL FROM CALIFORNIA.

BY PAUL BARTSCH.

[By permission of the Secretary of the Smithsonian Institution.]

Mrs. H. L. T. Walcott, of Dedham, Mass., during a recent visit to Palm Springs, San Diego County, California, collected a small lot of land shells which are believed to be an undescribed species of *Sonorella*. The shells are mostly dead and bleached, and were found in the crevices of rocks, filled with sand. A few individuals however still have part of the animal within them and it may be presumed that the color of these specimens is that of the living shell. This species may be known as:

Sonorella walcottiana sp. nov.

Shell moderately elevated, rather thin, polished, of light isabelline color, with a moderately broad dark chestnut band encircling the whorls somewhat posterior to the periphery. This band is bordered on each side by a narrow zone a trifle lighter than the general color of the shell and is usually almost completely covered in all the whorls except part of the penultimate and the last volution. Nuclear whorls one and one-half, marked by many microscopic, subspirally arranged, elongate-oval papillae. Post-nuclear whorls four and one-half, well rounded, somewhat inflated, marked by fine irregular lines of growth and a few minute scattered papillae. Sutures very distinct. Last whorl strongly deflected, the summit falling halfway between the dark spiral band and the base of the columella; slightly constricted behind the fairly well developed and somewhat reflected peristome. Columella obliquely curved, much expanded and decidedly reflected at the base where it almost conceals the umbilicus. Aperture large, oblique, rounded.

The type, number 170,007, United States National Museum Collection, measures: maj. lat., 23.5; min. lat., 18.5; alt., 15.5; aperture, maj. lat., 14; min. lat., 12.7 mm.

VOL. XVI, PP. 105-112 SEPTEMBER 30, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF NEW GENERA SPECIES AND SUBSPECIES OF AMERICAN BIRDS.

BY ROBERT RIDGWAY.

[By permission of the Secretary of the Smithsonian Institution.]

The following new forms are included in Part III of "Birds of North and Middle America,"* now mostly in print, the further printing and publication of which has been postponed until after June, 1904. In consequence of this long delay it is obviously desirable that these novelties be published in advance.

Budytes flavus alascensis, new subspecies.

Similar to *B. f. leucostriatus* but slightly smaller, especially the bill; coloration duller, the yellow of underparts paler and less pure, the chest more distinctly clouded or blotched with grayish, the olive-green of rump, etc., less pronounced.

Western Alaska.

Type, No. 73,231, Coll. U. S. Nat. Mus., adult male, St. Michael, Alaska, June 1, 1877; L. M. Turner.

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*Bulletin of the U. S. National Museum, No. 50.

Alopochelidon[*], new genus.

Tail less than half as long as wing, slightly emarginate, all the rectrices broad and rounded at tip; wing-tip little if any longer than distance from bend of wing to end of longest secondaries; above dull grayish brown.

Similar to *Stelgidopteryx* but differing in less adhesion between toes (in this respect agreeing with *Pygochelidon*), and in entire absence of recurved tips to barbs of outer web of outermost primary.

Type, *Hirundo fucata* Temminck.

Orochelidon[†], new genus.

Differing from *Atticora, Neochelidon* and *Notiochelidon* in having the subbasal phalanx of middle toe entirely free from the outer toe; from *Diplochelidon* in having the tail much less than two-thirds as long as wing, and forked for less than one-fourth its length (nearly even in one species), and nasal fossæ occupying at least basal half of maxilla.

Type, *Petrochelidon murina* Cassin (=*Hirundo cinerea* Gmelin?).

Diplochelidon[‡], new genus.

Nearest *Orochelidon*, but differing in having the tail more than three-fourths as long as wing, forked for one-half its length, the lateral rectrices attenuate; nasal fossæ very small, occupying much less than basal half of maxilla.

Type, *Hirundo melanoleuca* Maximilian.

Lamprochelidon[‖], new genus.

Nearest *Tachycineta* and *Callichelidon* but nasal operculum entirely feathered, the feathering of the frontal antiæ extending to the anterior end of the nasal fossæ and partly hiding nostrils.

Type, *Hirundo euchrysea* Gosse.

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[*] *'Αλωπός*, fox-like; *χελιδών*, a swallow.

[†] *''Ορος*, a mountain; *χελιδών*, a swallow.

[‡] *Διπλόος*, double; *χελιδών*, a swallow; with reference to its resemblance to swallows of two different types.

[‖] *Λαμπρός*, shining; *χελιδών*, a swallow.

Stelgidopteryx salvini, new species.

Similar to *S. serripennis* but pileum distinctly darker than back, tertials conspicuously margined with white (except in worn plumage), and chin and upper throat pale cinnamon or cinnamon-buff.

Southwestern Mexico (State of Jalisco) to Chiriqui.

Type, No. 30,716, Coll. U. S. Nat. Mus., adult male, Dueñas, Guatemala, October 17, 1859; O. Salvin.

Vireosylva gilva brewsteri, new subspecies.

Similar to *V. g. swainsonii* but larger (adult male averaging: wing, 73; tail, 52.5; exposed culmen, 11.2; adult female, wing, 71.7; tail, 50.3; exposed culmen, 10.8 mm.).

Mountains of Chihuahua, northwestern Mexico.

Type, No. 21,811, Coll. William Brewster, adult male, Bravo, Chihuahua, July 24, 1888; M. Abbott Frazar.

Vireosylva josephæ costaricensis, new subspecies.

Similar to *V. j. josephæ* but pileum paler sooty, wing shorter and tail longer.

Highlands of Costa Rica.

Type, No. 41,269, Coll. U. S. Nat. Mus., San José, Costa Rica; J. Carmiol.

Vireo huttoni cognatus, new subspecies.

Similar to *V. h. stephensi* but underparts without yellowish tinge, the chest not shaded with olive-buff; rump and upper tail-coverts less strongly olive-green.

Cape district of Lower California.

Type, No. 15,527, Coll. William Brewster, adult male, Sierra de la Laguna, Lower California, May 5, 1887; M. Abbott Frazar.

Vireo huttoni mexicanus, new subspecies.

Similar in coloration to *V. h. huttoni* but size decidedly larger (adult male averaging: wing, 67.3; tail, 51.9; adult female, wing, 65.4; tail, 51.2 mm.).

Southern portion of Mexican plateau to highlands of Guatemala.

Type, No. 143,442, Coll. U. S. Nat. Mus. (Biological Survey Collection), adult male, Mt. Orizaba, Puebla, April 26, 1893; E. W. Nelson.

Vireo bellii arizonæ, new subspecies.

Similar to *V. b. pusillus* but more strongly tinged with olive above, the sides and flanks more strongly tinged with yellowish olive. (Intermediate between *V. b. pusillus* and *V. b. medius*, and bearing to the former the same relation that *V. b. bellii* does to the latter.)

Extreme western portion of Texas to Arizona, and southward into northwestern Mexico.

Type, No. 98,790, Coll. U. S. Nat. Mus., adult male, Tucson, Arizona, March 21, 1884; E. W. Nelson.

Pachysylvia ochraceiceps pallidipectus, new subspecies.

Similar to *P. o. ochraceiceps* but chest pale buffy olive instead of light ochraceous-brown.

Southern Honduras to Chiriqui.

Type, No. 47,396, Coll. U. S. Nat. Mus., adult male, Angostura, Costa Rica, July 8, 1867; J. Carmiol.

Vireolanius pulchellus viridiceps, new subspecies.

Similar to *V. p. verticalis* but entire pileum, together with upper part of hindneck, green.

Veragua to Panama Railway.

Type, No. 40,148, Coll. Am. Mus. Nat. Hist., adult female, Panama; J. McLeannan.

Lanius ludovicianus mearnsi, new subspecies.

Similar to *L. l. mexicanus* but smaller, with larger bill.

San Clemente Island, Santa Barbara group, California; Santa Margarita Island, Lower California.

Type, No. 134,781, Coll. U. S. Nat. Mus., adult female, San Clemente Island, California, August 27, 1894; Dr. Edgar A. Mearns, U. S. A.

Aphelocoma unicolor cœlestis, new subspecies.

Similar to *A. u. unicolor* but larger and the blue color decidedly lighter (cerulean instead of cobalt).

Highlands of Guatemala and Chiapas.

Type, No. 144,685, Coll. U. S. Nat. Mus. (Biological Survey Collection), adult male, San Cristobal, Chiapas, September 24, 1895; Nelson and Goldman.

Bæolophus inornatus restrictus, new subspecies.

Similar to *B. i. inornatus* but darker, especially the underparts, the young conspicuously less brownish.

Vicinity of San Francisco Bay, California.

Type, No. 163,569, Coll. U. S. Nat. Mus., adult male, Oakland, California, March 24, 1896; Dr. J. Hornung.

Bæolophus inornatus murinus, new subspecies.

Similar to *B. i. inornatus* but larger, upperparts much grayer, underparts darker and grayer; similar to *B. i. griseus* but decidedly darker.

Southern California, in Los Angeles, San Bernardino, and San Diego counties; northern Lower California.

Type, No. 133,812, Coll. U. S. Nat. Mus., adult male, Nachoguero Valley, Lower California, June 4, 1894; Dr. Edgar A. Mearns, U. S. A.

Psaltriparus minimus saturatus, new subspecies.

Similar to *P. m. minimus* but darker in corresponding plumages; young with color of pileum duller, more grayish sooty.

Vicinity of Puget Sound.

Type, No. 136,372, Coll. U. S. Nat. Mus. (Biological Survey Collection), Mount Vernon, Washington, December 11, 1895; C. P. Streator.

Chamæa fasciata rufula, new subspecies.

Similar to *C. f. phæa* but paler; the back clearer sepia brown, the underparts lighter vinaceous-cinnamon.

Central coast district of California, in Marin, San Francisco, and Santa Clara counties.

Type, No. 82,620, Coll. U. S. Nat. Mus., Nicasio, Marin County, California, December 8, 1876; C. A. Allen.

Polioptila nelsoni, new species.

Similar to *P. cærulea mexicana* but adult male with forehead and crown (within the U-shaped black mark) blackish slate, distinctly glossed with greenish blue; adult female similar to that of *P. c. cæsiogaster* but upperparts duller slate-gray and underparts white medially.

Southeastern Mexico (States of Oaxaca and Chiapas).

Type, No. 142,695, Coll. U. S. Nat. Mus. (Biological Survey Collection), adult male, Oaxaca City, Oaxaca, June 21, 1894; Nelson and Goldman.

Polioptila bairdi, new species.

Similar to *P. albiloris* but smaller, and with lores not entirely white, but crossed with a black line (in adult male) from rictus to anterior angle of eye.

Western Nicaragua and Costa Rica.

Type, No. 89,693, Coll. U. S. Nat. Mus., adult male, San Juan del Sur, Nicaragua, January 6, 1883; C. C. Nutting.

Polioptila superciliaris magna, new subspecies.

Similar to *P. s. superciliaris* but decidedly larger (except length of tarsus), the wing much longer; coloration darker, the pileum, in adult female (adult male not seen!) nearly slate-black, the underparts pale gray (between french gray and cinereous), only the abdomen, hinder flanks, anal region and under tail-coverts being white.

Adult female.—Wing, 47.5; tail, 43; exposed culmen, 12.5 mm.

Highlands of central Costa Rica.

Type, No. 189,563, Coll. U. S. Nat. Mus., adult female, Cartago, Costa Rica, April, 1886; J. J. Cooper.

Telmatodytes palustris iliacus, new subspecies.

Similar to *T. p. palustris* but paler and much more refescent, the flanks and anal region conspicuously tawny buff or buffy cinnamon.

Mississippi Valley and Great Plains region, north to Alberta, east to Indiana, south in migration over greater part of Mexico (except northwestern portion) and along Gulf coast to western Florida, occasionally to middle and southern Atlantic coast.

Type, No. 90,199, Coll. U. S. Nat. Mus., adult male, Wheatland, Knox County, Indiana, April 30, 1883; R. Ridgway.

This form equals *T. p. dissæptus* Bangs *in part;* but the type of the latter, now before me, is from Wayland, Massachusetts, and, together with a large series from the same portion of the country, seems to me inseparable from *T. p. palustris.*

Heleodytes nelsoni, new species.

=*Campylorhynchus megalopterus* and *C. pallescens* of authors, not of Lafresnaye.

Similar to *H. megalopterus* (Lafresnaye)* but smaller, paler, and more brownish; bands on back dull brownish white or pale brownish buff; spots on underparts grayish brown instead of blackish.

Southeastern portion of Mexican plateau.

Type, No. 13,659, Coll. U. S. Nat. Mus., Jalapa, Vera Cruz, J. Montes de'Oca.

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*=*H. alticola* Nelson, which Mr. Nelson was misled into naming as new through an error of mine in identifying Lafresnaye's type.

VOL. XVI, PP. 113-116 SEPTEMBER 30, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE NORTH AMERICAN FORMS OF ASTRAGALINUS PSALTRIA (SAY).

BY HARRY C. OBERHOLSER.

Six geographical races of *Astragalinus psaltria* (Say) were recognized by Mr. Ridgway in his recent treatment of the genus*, as follows:

Astragalinus psaltria psaltria (Say).—Lower California and southwestern United States from Texas and Colorado to California.

Astragalinus psaltria arizonæ (Coues).—Northwestern Mexico and southwestern border of the United States from Texas to California, north to Colorado.

Astragalinus psaltria mexicanus (Swainson).—Mexico, except extreme southern and northwestern portions; north to Texas, New Mexico and Colorado.

Astragalinus psaltria croceus (Jouy).—Southern Mexico to Panama, casually to Colombia and Ecuador.

Astragalinus psaltria jouyi (Ridgway).—Yucatan.

Astragalinus psaltria columbianus (Lafresnaye).—Costa Rica to Venezuela and Peru.

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*Birds of North and Middle Amer., I, 1901, pp. 114–121.

With the last three we have no present concern, but the others will bear further elucidation. In the first place, the status of *Astragalinus p. arizonæ*, as currently accepted, has been very properly challenged by Mr. Brewster* and Mr. Grinnell†, as well as by Mr. Ridgway‡. Furthermore, the occurrence of all three forms—*psaltria*, *arizonæ* and *mexicanus*—in Colorado during the breeding season is alone sufficient to arouse suspicion.

The type locality of *psaltria* is the Arkansas River, near 105° west longitude (between Pueblo and Cañon City), Colorado§; and a series of summer males from Colorado Springs, Colorado, which for purposes of comparison may be considered practical topotypes, exhibits all gradations from the green-backed to the black-backed forms, representing thus *psaltria*, *arizonæ*, and *mexicanus*—all breeding at the same place! These differences are, however, in this case, quite certainly the result of age; and this conclusion is fortified by the occurrence of similar variations well within the range of the so-called black-backed form *mexicanus*,‖ in Texas, New Mexico, and even Mexico. Males breed in the green-backed plumage which probably is the condition of the first year; and one or two, possibly three, more seasons are required to complete the fully adult black dress. Say's *psaltria* was based on one of these immature green-backed specimens which are indistinguishable from individuals of the constantly green-backed form found in California; but notwithstanding this, the name must be used for the black-backed Colorado bird. Fully adult individuals from this latter state, that is, those with the black upper surface, seem, however, not to be proportionately so common, at least in collections, as the similar plumage of the Mexican bird, and moreover, have usually some slight mixture of olive green on the upper parts, though by far the greater number of Mexican birds have a similar trace of olive; but both these apparent differences may be due either to fortuitous selection in collecting specimens—as, for instance, appears to be the case with adult males of *Sporophila*

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*Bull. Mus. Comp. Zool., XLI, 1902, p. 136.

†Condor, 1902, pp. 115–116.

‡Birds of North and Middle Amer., I, 1901, p. 116.

§Say, Long's Exped. Rocky Mts., II, 1823, p. 40.

‖Swainson, Philos. Mag., N. S., I, 1827, p. 435 (Real del Monte, Hidalgo, Mexico).

morelleti from the Lower Rio Grande—or to a tendency toward intergradation with the green-backed form found farther to the westward. Moreover, there seem to be no other characters to separate the birds of Colorado (*psaltria*) from those of Mexico (*mexicanus*). From these facts it therefore is apparent that *Astragalinus p. mexicanus* is the same as *Astragalinus p. psaltria.*

The name *arizonæ** was based on New Mexico birds in the parti-colored immature plumage, and is undoubtedly a synonym of *psaltria.* The type (No. 37,091, U. S. Nat. Mus.) came from near Fort Wingate, New Mexico; and another specimen taken at the same time (June 28) is almost pure black above. In treating this form, Mr. Ridgway curiously enough overlooked the type and the two other specimens taken simultaneously by Dr. Coues, stating that none of these were in the collection of the United States National Museum†. New Mexico, with the exception of its extreme southwestern corner, seems to be inhabited solely by the black-backed bird *psaltria.*

All adult males from Lower California, California, Nevada, Arizona, together with those we have seen from Utah have the back olive green, apparently never assuming the black plumage of true *psaltria;* and rarely have even a mixture of black in the back or auriculars, such individuals indicating probably, as Mr. Brewster suggests, merely an aberrant tendency of this green-backed form. True intermediates doubtless do occur, however, in northwestern Mexico.

From what has been said in the foregoing paragraphs it may be premised that there are but two forms of *Astragalinus psaltria* in North America north of southern Mexico, and that one of these is unnamed. They may be distinguished as follows:

Astragalinus psaltria psaltria (Say).

Fringilla psaltria Say, Long's Exped. Rocky Mts., II, 1823, p. 40.
Carduelis mexicana Swainson, Philos. Mag., N. S., I, 1827, p. 435.
Fringilla melanoxantha Lichtenstein, Preis-Verz. Mex. Vög., 1830, p. 2.
Fringilla texensis Giraud, Sixteen Species North Amer. Birds, 1841, pl. 5, fig. 1.

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*Coues, Proc. Acad. Nat. Sci. Phila., 1866, pp. 82, 83.

†Birds of North and Middle Amer., I, 1901, p. 116, footnote.

Chrysomitris (Pseudomitris) mexicanus var. *arizonæ* Coues, Proc. Acad. Nat. Sci. Phila., 1866, pp. 82, 83.

Subspecific characters.—Upper parts, including wings and tail, black, the wings with broad white edgings, the tail with most of its feathers extensively white basally; entire under surface yellow.

Geographic distribution.—Mexico, excepting the northwestern and extreme southern portions; Texas, New Mexico, and Colorado.

Astragalinus psaltria hesperophilus, subsp. nov.

Astragalinus psaltria Auct., *nec* Say.

Subspecific characters.—Similar to *Astragalinus psaltria psaltria*, but ear-coverts, sides of neck, with back, nape, and rump, in fully adult plumage, olive green instead of black.

Geographic distribution.—Southwestern United States and northwestern Mexico, from California and Lower California to Utah, Arizona, and extreme southwestern New Mexico.

Description.—Type, adult male, No. 139,158, U. S. National Museum (Biological Survey Collection); San Bernardino, California, December 28, 1890; Dr. A. K. Fisher. Pileum, and upper tail-coverts black, the latter with olive green edgings; remainder of upper parts olive green with narrow dusky or blackish shaft streaks; tail black, the inner webs of the three outer pairs of rectrices largely white, and all the feathers narrowly margined externally with pale grayish; wings black, with a large white speculum at the base of the primaries, the tertials broadly bordered with white, the other quills narrowly edged with grayish and olivaceous; lesser and median wing-coverts edged with olive green; greater coverts broadly margined with greenish white; sides of head and neck olive green; entire under surface deep primrose yellow, paler on the crissum, whitish on the abdomen, and shaded with olivaceous on sides and flanks; lining of wing mixed gray, white, and black. Length of wing, 65.5; tail, 43; exposed culmen, 9; tarsus, 15; middle toe, 10 mm.

VOL. XVI, PP. 117-118 SEPTEMBER 30, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF HABENARIA FROM CUBA.

BY OAKES AMES.

This species is closely allied to *Habenaria odontopetala*, Rchb. f. (Fig. 2.) of peninsular Florida, Mexico, Central America and Cuba. It grows in rich hillside woodlands, usually where there is considerable shade, flowering during the winter months. On November 9, 1902, I discovered a single specimen in bloom in the Province of Pinar del Rio, near Cayajabos, a town which was destroyed in the Cuban war; and on a second expedition to the same locality made in January, 1903, with Robert G. Leavitt, I found numerous plants, both in flower and in fruit. *Habenaria odontopetala* was common here though its season of bloom was practically at a close. However, many flowers were still in good condition, and made possible a careful comparative study of both species in the field.

Habenaria Sanbornii, sp. nov. (Fig. 1).

Plants 2–8 dm. tall; roots fleshy, tubers short, elliptical or nearly so; leaves six to eight, quite rigid, dull gray-green, never glossy above, 5–20 cm. long, 2–3 cm. wide, lanceolate to narrowly elliptical, lower ones often obtuse, upper ones acute; cauline bracts lanceolate to lance-ovate, acuminate, acute; floral bracts similar, lower ones longer than the ovaries; racemes 6–30 cm. long, loosely or densely flowered, flowers few or many (twelve to sixty), pedicels short, nearly erect; lateral sepals greenish, strongly deflexed, falcate, spreading, elliptic-oblong, mostly 3-nerved, 7 mm. long; upper sepal similar in color, nearly orbicular, 3-nerved, 4 mm. long; petals 4 mm. long, greenish-yellow, oblong, somewhat quadrangular, the angles obtuse, rounded, at the summit of each petal the main nerve terminates in an abrupt denticle, anterior basal angle slightly protuberant; lip 5 mm. long, yellowish, oblong-linear, pointed, quite straight, deflexed, margin rather revolute, base on either side obscurely obtuse angled, otherwise the lip is entire and regular; spur 10–12 mm. long, slender, straight; stigmatic glands somewhat globular; ovary 11–12 mm. long, cylindrical, tapering to both ends.

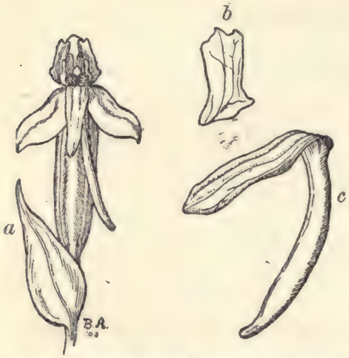

Fig. 1. *Habenaria Sanbornii* Ames (*a* x 1⅓, *b* and *c* x 3).

Cuba: In vicinity of Cayajabos, Pinar del Rio. *Type* in Author's Herbarium, No. 519. January 29, 1903 (Leavitt and Ames).

Habenaria Sanbornii, does not appear in Wright's collections of Cuban plants so far as I have been able to ascertain, and up to this time I have not succeeded in identifying my material with any species of *Habenaria* hitherto described. Typical specimens have been placed in the Gray Herbarium of Harvard University.

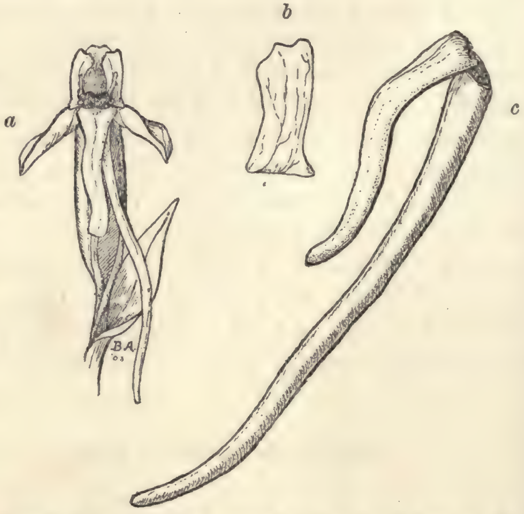

Fig. 2. *Habenaria odontopetala* Rchb. (*a* x 1⅓, *b* and *c* x 3).

The name of Edwin L. Sanborn, Jr., through whose kindness and hospitality I was enabled to make a considerable collection and study of Cuban orchids, is associated with this species.

VOL. XVI, PP. 119-120 SEPTEMBER 30, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW NATALINE BAT FROM THE BAHAMAS.

BY GERRIT S. MILLER, JR.

[By permission of the Secretary of the Smithsonian Institution.]

While accompanying the Bahama Expedition of the Geographical Society of Baltimore, Mr. J. H. Riley obtained four specimens of a nataline bat easily distinguishable from the species hitherto known. They were taken in a cave near Sandy Point, at the southwest corner of Watlings Island. The animal may be known as:

Chilonatalus tumidifrons, sp. nov.

Type.—Adult male (in alcohol) No. 122,024 United States National Museum. Collected on Watlings Island, Bahamas, July 12, 1903, by J. H. Riley. Original number 157.

Characters.—Not as small as *Chilonatalus micropus* and *C. brevimanus*, but forearm of about the same length as in the related species. Frontal gland extending from middle of forehead nearly to end of muzzle, and rising 5 mm. above level of eye. Skull and teeth essentially as in *Chilonatalus micropus*, but much less diminutive in size.

External form.—Except for the slight difference in size, the external appearance of *Chilonatalus tumidifrons* is closely similar to that of *C. micropus*. The forearm, however, is relatively shorter, and the ears are more evenly rounded off above. Lips and muzzle as in the related species, except that projection above nostrils is narrower. Penis less than half as long as foot, and readily concealed by surrounding fur. Membranes in no way peculiar. Frontal gland at least four times as large as in *Chilonatalus micropus*, much longer and higher than wide. It extends from a point on forehead nearly level with middle of proencephalon to within 3 mm. of nostril, a distance of about 8 mm. Its greatest width is 3.8 mm.; and its height, measured from corner of eye is a little over 5 mm. Its surface is finely rugose, and naked except for a sprinkling of minute hairs.

Color.—The fur is everywhere cream-buff, that of the belly clear and unmixed with brown, that of the back clouded with broccoli-brown. Ears light yellowish brown, darkening at edges. Membranes dark brown.

Skull and teeth.—Except for their greater size the skull and teeth do not differ appreciably from those of *Chilonatalus micropus.*

Measurements.—Type: total length, 87; head and body, 40; tail, 47; tibia, 18; foot, 7; forearm, 32; first digit, 5; second digit, 34; third digit, 65; fourth digit, 48; fifth digit, 49; ear from meatus, 14; ear from crown, 11; width of ear, 16; skull, greatest length, 15.8; basal length, 14; basilar length, 13; zygomatic breadth, 7.4; greatest breadth of braincase, 6.6; mandible, 11.4; maxillary toothrow exclusive of incisors (alveoli), 6.8; mandibular toothrow exclusive of incisors (alveoli), 7.

Specimens examined.—Four (two skins), all from the type locality.

VOL. XVI, PP. 121-122 SEPTEMBER 30, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW PIGMY SQUIRREL FROM CENTRAL AMERICA.

BY E. W. NELSON.

Although several squirrels belonging to the subgenus *Microsciurus* have been described they have all been based upon a very limited number of specimens. The rarity of these animals in recent collections from the region in which they occur makes it appear that they are either rare or extremely shy. Collectors visiting Central or northern South America should make special effort to obtain small squirrels, since the few specimens of *Microsciurus* already in existence show an unexpectedly large number of species with apparently rather restricted ranges. I am indebted to the generosity of Mr. Oldfield Thomas, Curator of Mammals of the British Museum, for the opportunity to describe the following species.

Sciurus (Microsciurus) boquetensis, sp. nov.

Chiriqui Pigmy Squirrel.

Type—Adult female, No. 3.3.3.38, British Museum. Collected at Boquete (alt. 6000 ft.), Chiriqui, Panama, May 7, 1903, by H. J. Watson. Original number 93.

Distribution.—Known only from type locality.

Specific characters.—Pelage soft, thick and woolly; tail slender, flattened; upperparts olive brown; breast rusty rufous; rest of underparts mainly grizzled bistre brown; tops of feet and toes washed with rusty. Size about that of *S. alfari.*

Color.—Upperparts including sides of body and upper surface of legs uniform olivaceous brown with a dull yellowish shade; sides of head and neck slightly paler and more yellowish; tops of feet and toes washed with rusty reddish; tail dull tawny olive finely washed and tipped with black and thinly edged with pale yellowish tips of hairs; chin and throat dingy rusty; underside of neck and breast rusty rufous shading back into dull grizzled brown; underside of tail dull tawny olive narrowly bordered with black and thinly edged with pale yellowish tips of hairs.

Measurements.—Measurements of type from dried skin: total length, 257; tail vertebræ, 116; hind foot, 37.

Cranial characters.—Premolars $\frac{2}{1}$. Skull longer and proportionately narrower than in *S. isthmius*; this character specially marked in rostrum; interorbital width narrower; brain-case narrower and more highly arched; lower jaw heavier with angle stronger and more broadly expanded; molar series longer and heavier. The skull of type measures: palatal length, 15.5; interorbital breadth, 14; length of upper molar series, 7.

Specimens examined.—One; from type locality.

General notes.—The soft thick pelage of this species indicates that it is a resident of a comparatively cool and probably humid climate.

The measurements of the apparently slightly over-stuffed type show that it is about the same size as *S. alfari.* It may be at once distinguished from *S. isthmius*, *S. alfari*, and *S. similis* by the rather pale, almost grayish, olivaceous color of upperparts, which entirely lack the warm reddish brown suffusion characteristic, in varying degree, of the three species named.

VOL. XVI, PP. 123-124 SEPTEMBER 30, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW HOGNOSE SNAKE FROM FLORIDA.

BY LEONHARD STEJNEGER.

[By permission of the Secretary of the Smithsonian Institution.]

Mr. E. J. Brown collected in 1901, near Lemon City, two hognose snakes lacking the azygos shield between the internasals. Fearing that they might be freaks only, I waited until the receipt of a young specimen in all essential features like the others. I propose to name this new form after its discoverer:

Heterodon browni, new species.

Diagnosis.—Maxillary teeth, 8 + 2; no azygos shield between internasals or prefrontals; rostral narrower than distance between eyes; scale rows, 25; ventrals, 114–127; anal divided; subcaudals, 47–53 pairs.

Habitat.—Southern Florida.

Type.—Immature female, No. 32,089 United States National Museum; Lemon City, Florida; E. J. Brown, collector.

Description.—*Adult male*: U. S. Nat. Mus. No. 31,926; Lemon City, Florida; E. J. Brown, collector. Rostral slightly recurved, the underside much wider than high, the upper portion about equalling its distance from frontal, the posterior projection less than half the suture between the internasals; rostral keel sharp; internasals broadly in contact, with no azygos shield between them, their mutual suture longer than that between the prefrontals; prefrontals undivided, large, in contact with each other, with frontal, supraoculars, upper preorbital, loreal and posterior nasals; frontal one and one-half times as long as broad, as long as parietals; nostril in suture between two nasals, opening backwards, the posterior nasal being hollowed out as is also the loreal though to a less extent, the two nasals and the loreal subequal in size; eye large, its horizontal diameter as long as its distance from anterior nasal, the vertical diameter greater than its distance from the edge of the lips; eye surrounded by a ring of 10 (or 11 on one side) shields including the supraoculars; temporals 2 + 3; 8 supralabials, sixth and seventh largest; mental very small; 9 lower labials, first pair large, broadly in contact behind mental, first, second and third in contact with chin-shield; only one pair of large chin-shields, in contact behind with four scale-like shields, the outer pair of which, which represent the posterior chin-shields, scarcely more developed than the others; 25 rows of scales around the middle of the body, 19 rows a head-length anterior to the vent, outer row smooth, the next very feebly carinated, the keeles increasing in distinctness towards the back; 114 ventrals; anal divided; 52 pairs of subcaudals. Color above sepia brown darker on the median line becoming paler on the sides, the back with 15 whitish cross-bands which widen on the sides where they enclose a roundish brownish-black spot; tail with nine whitish cross-bands without lateral spots; head with a brownish-black band across the prefrontals, with an anterior projection on the suture between the internasals, this prefrontal band extending obliquely backwards through the eyes to the angle of the mouth; a similar band running parallel with it from the parietals to the sides of the neck joining a large oblong blackish patch on each side of the neck; between these, on the nape, an elongate median blackish spot; a brownish black symmetrical figure of irregular outline on fronto-supraocular-parietal suture; a pale irregular band spotted with dusky across middle of frontal and supraoculars; underside clouded with brownish gray, leaving the middle of the ventrals more or less uniform pale.

Dimensions.—Total length, 398 mm.; tail, 88 mm.

The young specimen (U. S. N. M. No. 32,089), apart from slight deviations in the scale formula, which may be seen in the subjoined table, agrees completely with the two large specimens. Its ground color is less brownish, inclining as it does to purplish gray, and there is an additional lateral row of irregular blackish spots below the ocelli of the dorso-lateral cross-bands.

Scale formula.

U. S. N. M. No.	Sex and age.	Locality.	Scale rows	Ventrals	Anal	Subcaudals	Supralabials	Oculars	Temporals
30925	♂ ad.	Lemon City, Fla.	25	117	2	53	8	10	2 + 3
30926	♂ ad.	Lemon City, Fla.	25	114	2	52	8	10 (11)	2 + 3
32089	♀ juv.	Lemon City, Fla.	25	127	2	47	8	10 (11)	3 + 3 (4)

VOL. XVI, PP. 125-128 SEPTEMBER 30, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

GENERAL NOTES.

Earliest name for the American Crow.

Corvus americanus, in general use for the American Crow, dates from Audubon, 1834 (Orn. Biogr., II, p. 317), but C. L. Brehm fully described and named the species in 1822 (Beiträge zur Vögelkunde, II, 1822, p. 56), as *Corvus brachyrhynchos*. As there can be no question about the applicability of Brehm's name, it will become necessary to adopt it for the Common Crow. One subspecies will be affected by this change, viz: *Corvus brachyrhynchos pascuus* (Coues).—*Charles W. Richmond.*

Relationships of the Madagascar genus Hypositta Newton.*

The genus *Hypositta* has by common practice been placed in the family *Sittidæ*, but possesses so many pronounced and unique structural characters that I believe it to be entitled to rank as a distinct family, which may be characterized (in part) as follows:

HYPOSITTIDÆ, new family.

Small ten-primaried acutiplantar Oscines, related to *Sittidæ*, but with maxilla uncinate at tip, its tomia distinctly notched subterminally; hallux (without claw) nearly as long as middle toe (without claw); outer toe very nearly as long as middle toe, and united to the latter for the whole of its basal and half its subbasal phalanges; inner toe only about half as long as outer; acrotarsium booted; tail three-fourths as long as wing.—*Robert Ridgway.*

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*By permission of the Secretary of the Smithsonian Institution.

Note on Sciurus mollipilosus Audubon and Bachman.

In a recent note entitled 'The proper name of the Redwood Chickaree', published in these Proceedings (Vol. XVI, pp. 99, 100, June 25, 1903), Mr. Bangs objects to my identification of *Sciurus mollipilosus* Aud. and Bach. with his later described *Sciurus hudsonicus orarius*, which he now says "should be known as *Sciurus* (*Tamiasciurus*) *douglasi orarius* (Bangs)." His objection seems to be mainly that when the original authors of the name said: "This species was secured in Upper California, near the Pacific Ocean," and, "Our specimens were obtained in the northern part of California, near the Pacific Ocean," they did not really mean California at all but, "merely northwest coast of America, and is analogous to 'that part of California that adjoins Mexico' of the same authors." As to this 'analogous' expression, it originated with Bennett in 1833 (P. Z. S., 1833, p. 39), and, correctly quoted is: "that part of California which adjoins to Mexico," and is not in any sense Audubon and Bachman's. As "the northern part of California, near the Pacific Ocean" was at the time Audubon and Bachman wrote an unsettled wilderness belonging to Mexico, they could hardly have more definitely indicated the home of the Redwood Chickaree than by the phraseology they employed.

The coloration, as indicated by their figure, can be given little weight, when we recall the extravagant and unnatural tints that disfigure so large a part of their illustrations in the work to which reference is made, but the mention of white-tipped hairs in the tail, and lower parts "lightly tinged in some places with rufous" will apply very well to winter specimens I have seen of Mr. Bangs's *orarius*,—far better than to any other known form of the subgenus *Tamiasciurus*.

Mr. Bangs says that the only ground I gave "for using the name [*mollipilosus*] to supplant my [his] *S. orarius*" was the supposed origin of the specimens. As a matter of fact, the case seemed so clear to me that no argument or discussion of the matter appeared necessary. Nor is my opinion changed by Mr. Bangs's presentation of the case.

It will be noticed that Mr. Bangs now considers that *S. mollipilosus* belongs to the *hudsonicus* group and not to the *douglasii* group, and is of the opinion that it should be referred to either *S. h. vancouverensis* or *S. h. streatori*, both from British Columbia. Baird, however, in 1857, said: "I have no doubt that the *Sciurus mollipilosus* of Audubon and Bachman is the same animal in the cinereous pelage ascribed to the above species [*S. douglasii*] * * * From the remark that the cinereous of the underparts is in some places lightly tinged with rufous, I infer that the specimen described of *S. mollipilosus* was in a transition state between the summer and winter pelage" (Mamm. N. Amer., 1857, p. 277).

Mr. Bangs is, therefore, the first to question the correctness of the alleged locality.—*J. A. Allen.*

The Nodding Pogonia in the vicinity of Washington.

In August, 1903, while examining the woodland near the alluvial bottoms on the north side of Plummer's Island, I came unexpectedly upon several clumps of the Nodding Pogonia, *Triphora trianthophora* (Sw.) Rydberg. This orchid is credited with a range extending from Vermont to Florida, and westward to Wisconsin and Kansas, but it is everywhere rare and local except in certain portions of the Alleghenies. Certainly its discovery at this point furnishes another important addition to the flora of Washington and vicinity. Plummer's Island, in the Potomac, is located about nine miles from Washington, and belongs geographically to Montgomery County, Maryland. The central portion is high, rocky, and well timbered, the soil being a fine leaf mold. The basal portions, on the other hand, are level and often flooded when the river is at its higher stages.

This orchid has been very generally placed in *Pogonia* by modern authorities. In Britton's Manual, however, the genus *Triphora*, which Nuttall established for it, is restored. In the field the plant is certainly conspicuously different in appearance from other Pogonias. This is due mainly to the axillary inflorescence. The only other character of importance on which *Triphora* is based is the absence of a crest on the lip of the corolla.—*Charles L. Pollard.*

A new Violet from Kentucky.

VIOLA PRICEANA n. sp.—Acaulescent, erect, about 1.3 dm. high, from an oblique rootstock; leaves succulent, glabrous, rather dark green, cordate-ovate in outline, somewhat cucullate, the apex abtuse, the margin regularly crenate; scapes equalling or surpassing the foliage; flowers very large (3 cm. broad) pale lilac, shaded with purple near the base of the petals and conspicuously purple-veined; lateral petals copiously bearded with white hairs; petals broadly oblong or nearly orbicular, the keel petal narrower and deeply channeled, the spur large and blunt; cleistogamous flowers on horizontal or slightly ascending peduncles.

In rich soil, various stations around Bowling Green, Kentucky. The description is drawn from a clump of plants in my garden, sent to me in May, 1901, by Miss Sadie F. Price; these flowered rather sparsely in April, 1902, but more freely in 1903, and were conspicuous when in bloom on account of the contrast between the purple margins and pale ground color of the corolla. Miss Price reported it as very constant in its characters, and as easily distinguishable from other violets with which it grew.

A herbarium specimen taken from these living plants and deposited in the United States National Herbarium, is the type. I take pleasure in naming the species in honor of the lady whose recent decease has deprived us of a valuable field worker and intelligent collaborator.—*Charles L. Pollard.*

Scolecophagus preoccupied.

Scolecophagus Swainson, 1831, commonly used for a genus of North American birds, is preoccupied by *Scolecophagus* Geoffroy, 1795. For the genus of birds known as *Scolecophagus* the term *Euphagus* may be employed. The latter was used by Cassin in 1866 (Proc. Acad. Nat. Sci. Phila., 1866, p. 413) for *Psarocolius cyanocephalus* Wagler. The two species will thus stand as: *Euphagus carolinus* (Müller), and *Euphagus cyanocephalus* (Wagler).—*Charles W. Richmond.*

On the name Eniconetta.

Polysticta Eyton, 1836, as the generic name for Steller's Duck, has long since been rejected in favor of *Eniconetta* Gray, 1840, because of an alleged earlier *Polysticte* Smith, 1836 (sometimes erroneously quoted "1835"). It can be said, however, that Eyton's *Polysticta* was published in April, 1836 (Catal. Brit. Birds, p. 58), while Smith's *Polysticte* appeared not earlier than June (Smith consistently quotes it "June, 1836" in his Illustrations of South African Zoology), and possibly even later. Smith did not return from his expedition into the interior of South Africa until the middle of March, 1836, after which he prepared his "Report of the Expedition for Exploring Central Africa," published at Cape Town. The date cited by Smith may mean that of the completion of his MS. In any event Eyton's name *Polysticta* is prior to *Polysticte* Smith, and should be used for *Anas stelleri* Pallas.—*Charles W. Richmond.*

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF LARGE IGUANA FROM THE BAHAMA ISLANDS.

BY LEONHARD STEJNEGER.

[By permission of the Secretary of the Smithsonian Institution.]

Mr. J. H. Riley, of the United States National Museum, while attached to the Bahama Expedition of the Baltimore Geographical Society, during the summer of 1903, collected a good series of a large iguana belonging to the genus *Cyclura* on Watlings Island. He also secured a fine specimen of *Cyclura bæolopha* Cope on Andros Island, the type locality of this well-defined species. Two specimens collected by Mr. William Palmer in 1900 on the Isle of Pines, which I have regarded as typical of *Cyclura cyclura*, have furnished material for comparison, with the result that the Watlings Island specimens are here described as a new species. It will be noted that a large iguana from Cat Island has been recorded under the name of the Cuban species (Cope, Proc. U. S. Nat. Mus., 1887, p. 437), but in view of the close proximity of Cat Island to Watlings, it is probably nearer to the iguana described below, if not actually identical with it, than to the form inhabiting Cuba. The third species peculiar to the Bahamas is *Cyclura carinata* from Turk's Island, the most peculiar of them all.

Cyclura rileyi, sp. nov.

Diagnosis.—Combs on second and third toes; scales on muzzle large; no median protuberances anterior to eyes; verticils on tail feebly developed; a large patch of tubercular scales on side of throat below angle of mouth; a small shield in contact with nasal between supranasal and postnasal; dorsal crest represented by about 75 (71–79) enlarged strongly keeled scales.

Habitat.—Watlings Island, Bahamas.

Type.—United States National Museum, No. 31,969; Watlings Island, Bahamas, July 13, 1903; J. H. Riley, collector.

Description.—Adult female; United States National Museum, No. 31,969; Watlings Island; July 13, 1903; J. H. Riley, collector. Rostral wide, much wider than mental, broadly in contact with nasal; nasal very large, larger than any other shield on the head, broadly hexagonal, forming a long suture with its fellow; nostril nearly ovoid, large, near the upper posterior corner of the nasal; nasal in contact with a large elongate supranasal, and two postnasals, the upper one small and squarish, the lower larger, both this and the nasal separated from the anterior supralabials by two or three rows of small shields; supranasals broadly in contact on the middle of the snout, each followed by two pairs of prefrontals, one behind the other, both larger than supranasals, and the posterior pair larger than the anterior; the prefrontals are separated on the median line by a few small and irregular shields; top of head behind prefrontals covered by small irregular polygonal shields, those on outer and anterior portion of supraocular region being smaller, but otherwise without a clearly recognizable arrangement into supraorbital semi-circles and supraocular disks; all cephalic shields and scales smooth or slightly tuberculate; occipital somewhat larger than the adjacent scutes; no distinctly differentiated superciliary shields, only two of the anterior ones adjoining the canthus rostralis being somewhat enlarged and elongated; four small shields on canthus rostralis behind postnasals; shields covering the loreal triangle numerous, flat, elongate, irregularly polygonal and varying in size, anteriorly wedged in between the nasals and the supralabials, two to three rows separating the latter from the postnasal; a series of enlarged keeled suboculars separated from the supralabials by about seven rows of small elongate hexagonal scales; scales covering the temporal region irregular in size and shape, some almost granular; a group of larger tubercular shields or scales in front of the upper edge of the tympanum, one being particularly prominent, and a single series of similar ones along the anterior edge of the tympanum; tympanum ovoid, its vertical diameter less than diameter of eye; supralabials low and elongate, six to under the center of the eye; lower labials higher than the supralabials, but smaller than the malar shields; the three anterior malars in contact with the lower labials, the posterior ones separated from them by one and two rows of elongate polygonal shields but no granules or small scales; the posterior malars with a blunt tubercle or keel at the lower edge; throat covered with small uniform juxtaposed scales; on each side below the angle of the mouth a patch of larger, more rounded tubercles separated by scales corresponding to the other throat scales; a strong transverse fold across the lower neck joined by numerous longitudinal folds on the sides of the neck and a high (about 25 mm.) dewlap on the median line; back covered with small uniform squarish scales in tolerably regular series, 10–12 scales in the long diameter of the tympanum; a curved nuchal crest consisting of about 20 spines, the longest about 25 mm. high and slightly falcate; a series of 79 enlarged, elongate, keeled scales forming a slight crest on the median line of the back; scales on underside similar to those on back, those on upper side of arm, especially forearm, somewhat larger, those on hind legs even more so (about 6 in the long diameter of the ear) and with indication of keels; a single series of about 20 femoral pores; inner side of second toe with one "comb," of third toe with two "combs," each consisting of three lobes; tail compressed, covered with obliquely keeled scales in vertical rows forming but faintly indicated verticils, about five rows of the larger scales to a verticil where such can be made out; tail surmounted by a series of enlarged, pointed, triangular scales forming a strongly serrated edge.

Color, which according to Mr. Riley has not changed materially in the preserving fluid, dull "smoke gray," on the upper surface irregularly and obscurely marked with variously anastomosing blotches and marblings of "tawny-olive."

Dimensions.—Total length (tail regenerated), 597 mm.; tip of snout to vent, 272; tip of snout to orbit, 24; tip of snout to ear, 51; width of head, 35; fore limb, 106; hind limb, 161; vertical diameter of tympanum, 9.

In No. 31,966 which has the tail complete the dimensions are as follows: Total length, 558 mm.; tip of snout to vent, 208; vent to tip of tail, 350. The tail is consequently more than 1½ times the length of head and body.

Variation.—The individual variation displayed by the seven specimens collected is surprisingly small. The scutellation is essentially as in the type specimen described above, with here and there an additional small shield intercalated where two sutures meet, the only greater deviation being that of No. 31,970 in which the anterior prefrontals are devided transversely. The anterior superciliaries are also better defined in some of the specimens than in the one described, and the arrangement of the supraorbital ridge is also occasionally better defined. The number of enlarged keeled scales forming the dorsal crest, or rather ridge, varies between 71 and 79, one each having these numbers, one each having 73, 76 and 77 and two 75 scales. The color is also fairly uniform throughout the series.

Remarks.—This new species, though probably nearest related to the Cuban *C. cyclura*, shows certain leanings towards *C. cornuta* in the smallness of the scales covering arms and legs and the undeveloped condition of the caudal verticils. The similarity to the other Bahaman species is not remarkably close, and altogether the new form may be easily identified by the characters pointed out in the diagnosis.

Field notes by Mr. Riley.—This species is very common on two small keys in the large salt-water lake on Watlings Island, but is very rarely found on the main part of the island, probably caused by the large number of cats that are said to be running wild. The iguanas must have reached the keys by swimming. The large key is locally known as Iguana Cay. It is several hundred yards long and fifteen or twenty broad. Mangroves grow around the shore, but the center is covered with a large cactus tree. The key, of course, is nothing but coral rock. The ground under the cactus is bare and here most of the iguanas are found. They have a habit of running very swiftly and then suddenly stopping, unless very much frightened when they go into holes in the rock, with which their domain is abundantly supplied. They have a lumbering gait that carries them over the ground very rapidly. They also climb trees to some extent, and one of those shot was about five feet up in a mangrove. Two of the females opened were heavy with eggs, one of them containing five, about the size of turtle eggs.

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PROCEEDINGS

OF THE

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ON SPECIES OF SOUTH AMERICAN DELPHINIDÆ DESCRIBED BY DR R. A. PHILIPPI IN 1893 AND 1896.

BY FREDERICK W. TRUE.

In 1893 Dr. R. A. Philippi, Director of the National Museum of Chili, described several new species of porpoises and commented on various South American forms previously known. In 1896 he supplemented this by a second paper on the same subject.*

These two papers constitute a valuable contribution to the knowledge of the *Delphinidæ* of South American seas, but, on account of lack of access to recent literature, or for some other reason, many of the different forms are assigned to genera to which they can at present hardly be considered to belong. As I have given the family *Delphinidæ* considerable study and have examined the types of the majority of the species described by Gray and other cetologists, I venture to express below my opinions as to the probable affinities and correct scientific names of the various forms described or mentioned by Dr. Philippi.

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*Philippi, R. A., Los Delfinos de la Punta Austral de la América del Sur. <*Anal. Mus. Nac. Chile*, Sec. 1, Zool., No. 6, 1893, pp. 1–18, pls. 1–5. Philippi, R. A., Los Cráneos de los Delfines Chilenos. <*Op. cit.*, No. 12, 1896, pp. 1–20, pls. 1–6.

For the sake of brevity I have cited the earlier paper by its date, 1893, and the later one by 1896, adding the proper page number.

"**Delphinus? superciliosus** Lesson" (1893, p. 6, pl. 1, fig. 2).

Dr. Philippi copies Lesson's figure of this species and makes a few remarks regarding it, but mentions no new material. It seems hardly probable that the species belongs to the genus *Delphinus.* The shape of the snout would rather indicate *Lagenorhynchus*, though the coloration is not characteristic of that genus.

"**Delphinus cæruleo-albus** Meyen" (1893, p. 6, pl. 1, fig. 1).

This species, the type-skull of which I examined in 1887, belongs to the genus *Prodelphinus.* (See Bull. 36, U. S. Nat. Mus., p. 62.)

"**Delphinus amphitriteus** Philippi" (1893, p. 7, pl. 1, fig. 3).

The osteological characters of this species are not given, nor is the skull figured, and it is uncertain, therefore, whether it belongs to the genus *Delphinus* or *Prodelphinus.* The probabilities are much in favor of the latter. Dr. Philippi compares it with *cæruleo-albus*, but points out differences of color and proportions by which it may be distinguished from that species. In this he is no doubt justified, though as *cæruleo-albus* is a South American species and its range of color variation is unknown, later observations may show that there is a closer relationship between these two forms than can now be made out. It is interesting to note the resemblance between *amphitriteus* and the *Delphinus marginatus* of Pucheran, which I consider identical with *Prodelphinus euphrosyne* (Gray); also between the former and the *Delphinus lateralis* of Peale, which is likewise probably a *Prodelphinus* (See Bull. 36, U. S. Nat. Mus., pl. 15, figs. 1 and 3).

"**Phocæna (Hyperoodon?) albiventris** Perez in lit." (1893, p. 8, pl. 2, fig. 3).

"**Tursio (Phocæna) albiventris** Perez" (1896, p. 15, pl. 4, fig. 3; pl. 5, fig. 3; pl. 6, fig. 3?).

Why the generic name *Hyperoödon* should have been used in connection with this species is far from clear, as nothing about it suggests that genus in any way. The use of the generic name *Tursio* is much more easily justified, for Gray, in 1866, included under it one species, *Tursio eutropia*, which is probably closely related to, or identical with, Dr. Perez Canto's *albiventris*. The original type of Gray's *Tursio* in 1844, however, was the species now generally known as *Tursiops tursio*, which is certainly not congeneric with *eutropia*. The point is of no special importance as the generic name *Tursio* was used by Fleming and by Wagler prior to the date at which Gray first employed it.*

The proper name for *Delphinus eutropia* Gray is *Cephalorhynchus eutropia*. Whether *P. albiventris* of Perez Canto is really identical with that species is not entirely certain, though there is a strong probability that such is the case. I was at first inclined to associate *albiventris* with *Lagenorhynchus obscurus* (Gray) which it certainly resembles in proportions, though not exactly in color. Dr. Philippi's figures of the skull, however, show that his species is a *Cephalorhynchus*, and his measurements agree well with those of the type-skull and other specimens of *C. eutropia*, except that the beak appears to be a little longer. Dr. Perez Canto's description and figure of the exterior show that the color-pattern resembles that of other species of *Cephalorhynchus* except that the posterior lateral white mark is not divided by an anteriorly-directed arm of black, to form a trident. The shape of the pectoral fins is that of a *Cephalorhynchus*. As the exterior of *C. eutropia* has remained unknown hitherto, this identification, if correct, is of much interest. The type and another specimen of *C. eutropia* in the British Museum are from the coast of Chili, and the skull in the United States National Museum is also believed to be from that locality.

Trouessart cites *albiventris* under the genus *Cephalorhynchus*, with a mark of interrogation.* After Dr. Perez Canto had sent a description of the species to Dr. Philippi, he published one himself in the Actes de la Société Scientifique du Chili, 5, p. 227, 1896, under the name of *Phocœna albiventris.*

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*See Palmer, T. S. Notes on three genera of Dolphins. <Proc. Biol. Soc. Washington, XIII, 1899, p. 23.

"**Phocæna philippii** Perez in lit." (1893, p. 9, pl. 3, fig. 2).

"**Acanthodelphis (Phocæna) philippii** Perez Canto" (1896, p. 8, pl. 3, fig. 2.)

The description of this species published by Dr. Philippi in 1893 was accompanied by a figure of the exterior (pl. 3, fig. 2). This figure was replaced in 1896 by a rather better one from another individual, showing the tubercles on the dorsal fin, etc.; figures of the skull were also added (1896, pl. 2, fig. 2; pl. 3, figs. 1–5

From the latter it is obvious that Dr. Perez Canto was correct in referring the species to the genus *Phocœna.* It seems scarcely advisable to give generic rank to the later name, *Acanthodelphis*, which Gray established in 1866 as a subgeneric name for Burmeister's *Phocœna spinipinnis*, since the characters on which the distinction is based are those of proportions and of the dermal tubercles. In cranial characters *spinipinnis* does not differ from *Phocœna.*

Dr. Philippi's figures of *philippii* show (as he himself recognized) that this species is most closely allied to *spinipinnis.* He considers that it should be regarded as distinct on account of the shape of the head, the size of the mouth and the shape of the caudal margins; also because of certain differences in the details of the skull. So far as the external characters are concerned, the shape of the head is the only one which would seem to me likely to be of importance. The shape of the caudal peduncle in Burmeister's figures is probably due to an artist's misconception. It will be noticed that it is followed in all Burmeister's figures without regard to what genera and species they represent.* Dr. Philippi's figures go to the other extreme, and show the caudal region as an elongated cone. It is not likely that a photograph would substantiate either of these forms, so that this character is hardly worth insisting upon. The dimensions of the body appear to be quite alike in the two species. The excellent figures of the skull *P. philippii* show that it is very closely allied to *spinipinnis*. The differences in detail which Dr. Philippi points out seem to me individual rather than specific. It is to be remembered that *P. spinipinnis* is a South American species, though from the Atlantic instead of the Pacific.

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*Trouessart, Cat. Mam., 1898–99, p. 1041.

On the whole, I am inclined to the opinion that *spinipinnis* and *philippii* are specifically identical.

Trouessart cites *philippii* under the genus *Cephalorhynchus*, with a mark of interrogation,† but I am unable to find any warrant for that association.

After Dr. Perez Canto had sent the description of this species to Dr. Philippi, he decided to publish an account of it himself, which he did in the Actes de la Société Scientifique du Chili, 5, p. 227, 1896, under the name of *Phocæna philippii.*

"**Phocæna posidonia** Philippi" (1893, p. 9, pl. 2, fig. 1).

The skull of this species is not figured or described, but judging from the shape of the head, it should be assigned to the genus *Lagenorhynchus*. There is nothing about it which suggests a *Phocæna*. Dr. Philippi compared it with *L. fitzroyi*, which he very properly considers as closely allied to it, having

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*Beddard (Book of Whales, 1900, p. 251) regards the caudal ridges shown in Burmeister's figure of *P. spinipinnis* as "the most remarkable character," and views it as a survival of an embryological character. I cannot subscribe to this opinion for the reason given above. It is true that Dall's figure of *Phocæna dallii*, which I copied in Bull. 36, U. S. Nat. Mus., pl. 37, fig. 1, shows similar ridges, but I believe this to be an inaccuracy also. It appears to be a matter of special difficulty to make a correct graphic representation of the caudal region of a cetacean. Some artists exaggerate the thinness of the superior and inferior margins, while others give this region the shape of a truncate cone, and do away with the ridges altogether.

† Trouessart, Cat. Mam., 1898–99, p. 1041.

the same form and an equal number of teeth. He considers, however, that it is distinguishable by the color and the shape of the head. So far as the latter is concerned, it will be seen by consulting Bull. 36, U. S. Nat. Mus., p. 88, where the outline of the head of the type of *L. fitzroyi* is given, that Waterhouse's figure is not likely to be correct in this particular. The difference in color is considerable and constitutes a sufficient reason for regarding *L. posidonia* as a separate species, though it could be wished that the sketch of *L. fitzroyi* had more the appearance of accuracy. It should be noted that *L. posidonia* and *L. fitzroyi* are from localities on the coast of Chili separated by about 450 miles.

"**Phocæna d'orbignyi** Philippi" (1893, p. 10) "(**Delphinus cruciger** D'Orb. non Quoy et Gaim.)."

Dr. Philippi regards it necessary to rename the *Delphinus cruciger* of d'Orbigny (1847) on account of its being preoccupied by *D. cruciger* Quoy and Gaimard (1824). As I explained in 1889,* Quoy and Gaimard's species was one of those founded on porpoises "vus en mer et dessinés à distance." I do not consider it, therefore, as having any validity. Such being the case, it seems to me that *D. cruciger* d'Orbigny and Gervais may be allowed to stand.

"**Phocæna lunata** (**Delphinus**) Lesson" (1893, p. 11, pl. 3, fig. 3).

This name was applied by Lesson† to a kind of porpoise seen in the bay of Concepcion, Chili. He remarks: "We were unable to kill a single individual." In view of this statement, it seems to me that the species has no status.

"**Phocæna cruciger** (**Delphinus**) Quoy and Gaimard" (1893, p. 11, pl. 3, figs. 4 (**bivittata**) and 5).

This species, and the *D. bivittata* of Lesson, which Dr. Philippi cites in the same connection, are among those "vus en mer et dessinés à distance." They do not appear to me to merit serious consideration. F. Cuvier very justly remarks regarding these and other similar species:

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*Bull. 36, U. S. Nat. Mus., p. 91.

†Voyage of the *Coquille*, Zoology, I, 1826, p. 182.

> These dolphins having been seen by trained men, by observers whose experience is the result of long practice, promise some day to really enrich natural history; but until they have been found again and their skins have been collected, so that their principal parts can be studied, we can only regard them as probable types of species destined to be established at some time more or less near.*

The object of assigning this species both to *Phocæna* and to *Delphinus*, or what is intended thereby, is not clear. In the index it is cited under both genera.

"**Phocæna obtusata** Philippi" (1893, p. 12, pl. 3, fig. 1).

This remarkable species is quite unlike any porpoise with which I am acquainted, especially as regards coloration. As no part of the skeleton is figured or described, it is impossible to decide whether the species really belongs in the genus *Phocæna.* Certainly the pattern of coloration is very different from that of any other species of the genus. The shape of the fins and head suggest relationship with *Cephalorhynchus*, but the color-pattern does not agree. Further information regarding this species will be received with much interest. The size of Dr. Philippi's specimen would suggest that it was not fully adult.

"**Delphinapterus leucorrhamphus** (**Delphinus**) Péron" (1893, p. 15, pl. 4, figs. 2 and 3).

Dr. Philippi quite properly inquires why Lacépède changed the name *leucorrhamphus* in Peron's manuscript to *peronii.* So it was, however, and the latter name under rules now generally adopted is binding. The generic name *Delphinapterus*, however, was originally applied by Lacépède to the white whale or beluga. Later, Lesson transferred it to *leucorrhamphus* or

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*Hist. Nat. des Cétacés, 1836, p. 225.

peronii, which was not correct. The latter must take the next valid generic name which is *Lissodelphis*. The proper name of the species under consideration, therefore, is *Lissodelphis peronii* (Lac.).

Dr. Philippi gives an excellent figure of the species, from a specimen taken east of Patagonia, which is the exact counterpart of the figure published by Gray and copied in Bull. 36, U. S. Nat. Mus., pl. 21, fig. 1.

The opinion is expressed by Dr. Philippi that the animal referred to this species by Lesson* really represents a separate species to which he gives the name *Delphinapterus lessonii* (*op. cit.*, p. 17). My own opinion in the matter was expressed in 1889, in Bull. 36, U. S. Nat. Mus., p. 79, as follows:

> "Lesson's figure (Voyage of the *Coquille*, pl. 9, fig. 1) represents a dolphin with white flukes and an elongated beak, which characters are also mentioned in the text. This may be a distinct species, though it is more than probable that the figure is inaccurate."

The measurements of Lesson's and Philippi's specimens show more agreements than discrepancies.

"**Globiocephalus globiceps** (**Delphinus**) Cuv." (1893, p. 17).

"**Globiocephalus chilensis** Philippi" (1896, p. 7, pl. 1, figs. 3 and 4).

Dr. Philippi had two skeletons from the coast of Chili, which in 1893 he regarded as belonging to *Globicephala globiceps* (=*G. melas*), but in his paper of 1896 he describes them as a new species, under the name of *G. chilensis*.

The figure and measurements of the skull given by Dr. Philippi indicate that *chilensis* is a separate species of the group of which *melas* is typical. In this group of blackfish the premaxillæ do not cover the maxillæ completely in the anterior portion, and there is a large sagitate white mark on the inferior surface of the body. Dr. Philippi does not describe the color of

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*Voyage of the *Coquille*, Zoology, I, pt. 1, p. 180.

chilensis, but the skull presents the character just mentioned. The measurements indicate that the rostrum of the skull is longer relatively than in *melas*, and the cranium narrower. In Dr. Philippi's two skeletons the number of vertebræ was 54 and 57 respectively. If the specimens were complete, this would indicate a specific difference, as in *G. melas* there are 59 or 60 vertebræ.

Globiocephalus grayi Burmeister, with which Dr. Philippi compares his specimens, does not belong to that genus, but is identical with *Pseudorca crassidens* Reinhardt.

"**Delphinus chilensis** Philippi" (1896, p. 10, pl. 2, fig. 3).

This species is founded on a foetus 24.6 cm. long. It is probably either a *Delphinus* or a *Prodelphinus*, but one can hardly hazard an opinion without knowing something of the characters of the skull, which is neither figured nor described by Dr. Philippi. It seems undesirable to found species on foetal specimens in this difficult group of animals. The uncertainties are already sufficiently formidable, and ought not to be added to.

"**Eutropia dickii** Gray" (1896, p. 11).

An examination of the type of this species which I made in 1884, convinced me that it belonged to the genus *Cephalorhynchus*. The correct name is *C. eutropia*. (See Bull. 36, U. S. Nat. Mus., p. 112.)

"**Tursio? panope** Philippi" (1896, p. 14, pls. 4–6, fig. 2).

I confess that I am unable to determine even the genus to which this singular species belongs. The quite thin orbital edges, the (apparently) separate pterygoids and straight mandible suggest *Lissodelphis*, but the small number of teeth and above all the extraordinary curviture of the expanded proximal end of maxilla, do not accord with that genus. Indeed the character last mentioned is not present in any genus of the *Delphinidæ* with which I am acquainted. If the drawings of the skull are correct in this particular, the species probably represents a genus not hitherto known. Further study of the type-specimen can alone resolve the problem.

"**Tursio platyrrhinus** Philippi" (1896, p. 16, pl. 4, fig. 1; pl. 5, fig. 1; pl. 6, fig. 1?).

I am of the opinion that this species should be assigned to the genus *Cephalorhynchus*, and that in spite of the differences in the skull shown by the figures, it is probably the same as the *albiventris* Philippi, which I consider identical with *C. eutropia* (Gray). Dr. Philippi remarks of it:

> The nasal bones are very peculiar, are flat and do not extend out at all; they do not touch the intermaxillæ as in the foregoing species (*albiventris*) but only the maxillæ, and each exhibits a large oblique cavity, which occupies the middle of the bone, The beak is a little narrower than in the preceding species, and I should have referred the two skulls of *T. platyrrhinus* to that species, if I did not believe that the different form of the nasals is a distinguishing character of the greatest importance.*

In view of the great amount of individual variation in the form of the nasals in all species of the *Delphinidæ*, it does not seem probable that this character alone is sufficient for the separation of species.

It will be noted that the shape of the beak in *T. platyrrhinus* as given on pl. 4, fig. 1, is very different from that in *albiventris*, but by examining the contour of the same skull shown in pl. 5, fig. 1, it becomes obvious that the outline in the former case is incorrect. I cannot help suspecting also that figure 3, plate 6, is intended to represent *platyrrhinus*, and figure 1 of the same plate, *albiventris*.

The species mentioned or described by Dr. Philippi and their probable identity as indicated above are as follows:

**Op. cit.*, p. 16.

Name of species mentioned or described by Dr. Philippi.	**Probable identity.**
Delphinus? superciliosus Lesson.	*Lagenorhynchus? superciliosus* (Lesson.)
Delphinus cæruleo-albus Meyen.	*Prodelphinus cæruleo-albus* (Meyen).
Delphinus amphitriteus Philippi.	*Prodelphinus amphitriteus* (Philippi).
Phocæna (*Hyperoodon*) *albiventris* Perez Canto. *Tursio* (*Phocæna*) *albiventris* Perez Canto.	*Cephalorhynchus eutropia* (Gray).
Phocæna philippii Perez Canto. *Acanthodelphis* (*Phocæna*) *philippii* Perez Canto.	*Phocæna spinipinnis* Burmeister.
Phocæna posidonia Philippi.	*Lagenorhynchus posidonia* (Philippi).
Phocæna d'orbignyi Philippi (=*D. cruciger* d'Orbig., non Quoy et Gaim.).	*Lagenorhynchus cruciger* (d'Orbigny and Gervais).
Phocæna lunata (*Delphinus*) Lesson.	Not based on specimens.
Phocæna cruciger (*Delphinus*) Quoy and Gaimard.	Not based on specimens.
Phocæna obtusata Philippi.	*Cephalorhynchus? obtusata* (Philippi).
Delphinapterus leucorrhamphus (*Delphinus*) Peron.	*Lissodelphis peronii* (Lacépède).
Globiocephalus globiceps (*Delphinus*) Cuv. *Globiocephalus chilensis* Philippi.	*Globicephala chilensis* Philippi.
Delphinus chilensis Philippi.	Based on a foetus.
Eutropia dickii Gray.	*Cephalorhynchus eutropia* (Gray).
Tursio? panope Philippi.	New genus?
Tursio platyrrhinus Philippi.	*Cephalorhynchus eutropia* (Gray).

VOL. XVI, PP. 145-146 NOVEMBER 12, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW HARE FROM GREECE.

BY GERRIT S. MILLER, JR.

[By permission of the Secretary of the Smithsonian Institution.]

A hare from Mount Parnassus, Greece, recently procured by the United States National Museum, differs conspicuously from all of the forms related to *Lepus europæus* that have been recognized during the past few years. As no name has as yet been applied to the Grecian hare the animal may be known as:

Lepus parnassius, sp. nov.

Type.—Adult male (skin and skull), No. 122,093, United States National Museum. Collected at Agorianni, north side of Lyakura (Parnassus) Mts., Greece, September 10, 1895. Received from Wilhelm Schlüter, of Halle, on the Saale, Germany.

Characters.—Intermediate in size between British specimens of *Lepus occidentalis*, and Swiss examples of *L. europæus*, but nearer the latter. General color less yellow than in the related forms; ears grayish instead of yellowish, and with much more extensive black area at tip; rump scarcely different from back. Skull with rostrum much less heavily built than that of *Lepus europæus*.

Color.—Hairs of dorsal surface, with four color bands. Beginning at the base there are (1) whitish smoke-gray, 12 mm., (2) black, 7 mm., (3) pinkish-buff, 5 mm., (4); black, 5 mm. The general effect is a coarse grizzle of black and pinkish-buff, the latter very slightly in excess, much less so than the light, clear buff of the corresponding region in *Lepus europæus.* Sides and neck not noticeably different from back, but the grizzle less distinct, owing to the replacement of the sub-basel black by hair-brown. Rump essentially like back, but with a slight grayish cast due to the light gray bases of the hairs. The exact shade of this under color is about Ridgway's gray No. 10 at base of hairs, darkening to gray No. 7 near surface. Cheeks like sides, but more finely grizzled, and with a faint blackish wash below ear. An indistinct grayish-buff eye ring and loral stripe. Crown and face like back but more finely grizzled, and the bases of the hairs wood-brown. Ears light silvery-gray (the exact color not given by Ridgway) except for the following markings: a very finely grizzled stripe essentially concolor with top of head extending up anterior outer surface almost to tip, and about 20 mm. wide at middle; a similar area 45 mm. long by 12 mm. wide near middle of posterior inner surface; a black apical patch 40 mm. long by 30 mm. wide on posterior outer surface, extending downward along posterior outer rim as a band 4 mm. in width to about middle of ear, and spreading over both surfaces at tip and along upper fourth of anterior margin, the black apical area on inner surface about 10 mm. wide; a clear ochraceous-buff area 10 mm. in width between apical black and general gray of inner surface; a whitish line 3 mm. in width along inner anterior margin from base to above middle. Feet, outer surface of legs, flank patches, and throat, dull ochraceous-buff. Underparts and inner surface of legs white, this color much suffused with ochraceous-buff on front legs. Tail missing.

Skull and teeth.—The skull differs from that of *Lepus europæus* in smaller size and much less robust form. This is particularly noticeable in the rostral portion of the skull, both depth and width of which are reduced, but is also very evident in the form of the braincase. Supraorbital processes smaller than in *Lepus europæus.* Teeth as in the related species.

Meausurements—External measurements of type (from well made skin), head and body, 600; hind foot, 150 (140); ear from crown, 130. Cranial measurements of type: greatest length, 96 (99)*; occipito nasal length: 94; diastema, 32.6 (30); greatest (oblique) length of nasals, 44 (45); length of nasals along median suture, 37.6 (40); breadth of both nasals together at middle, 16.6 (20); greatest breadth of both nasals together posteriorly, 21 (23.6); least interorbital breadth behind supraorbital processes, 14.4 (12); zygomatic breadth, 44 (48); breadth of braincase below roots of zygomata, 31 (34); palatal depth 24.6 (28); mandible, 75 (76); maxillary molar series (alveoli), 15.4 (18.6); mandibular molar series (alveoli), 18.4 (20.4).

Specimens examined.—One, the type.

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*Cranial measurements in parenthesis are those of an adult female *Lepus europæus* from Werdenberg, Switzerland (No. 105,831).

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OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SQUIRREL FROM LOWER SIAM.

BY GERRIT S. MILLER, JR.

[By permission of the Secretary of the Smithsonian Institution.]

Five small lineated squirrels collected by Dr. W. L. Abbott in Trong, Lower Siam, differ markedly from the Burman *Sciurus barbei.* So far as can be judged from descriptions they are identical with the Malaccan *Sciurus macclellandi leucotis* of Bonhote*, though without actual comparison of specimens this question must remain open. They are, however, very doubtfully the same as the *Tamias leucotis* of Temminck†; and the name adopted by Mr. Bonhote is certainly invalidated by Gapper's earlier use of *Sciurus leucotis* for an American squirrel‡. The animal occuring in Trong may be known as:

Sciurus novemlineatus, sp. nov.

Type.—Adult male (skin and skull), No. 84,403, United States National Museum. Collected at 1500 ft. elevation in heavy forest among the hills of Trong, Lower Siam, February 19, 1897, by Dr. W. L. Abbott.

Characters.—Externally similar to *Sciurus barbei* Blyth, but ear smaller and with the hairs of the white tuft scarcely, if at all, blackish at base.

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*Ann. and Mag. Nat. Hist., 7th ser., V, p. 53, January, 1900.

†Esquisses Zoologiques sur la Côte de Guiné, p. 252, 1853. "Peninsula of Malacca."

‡Zool. Journ., V, p. 206, 1830. Ontario.

Skull smaller than that of the Burman animal, the rostrum relatively shorter, and region between anterior zygomatic roots proportionally broader.

Color.—Type: sides of body and outer surface of legs hair-brown faintly tinged with yellowish, particularly on flanks. Back with nine longitudinal stripes as follows: a median black stripe 3 mm. in width is succeeded by a slightly broader stripe of dull ochraceous-buff; beyond this lies a black stripe 7 mm. wide followed by one of clear buff of similar width; this in turn is bordered on the outer side by a black line about as broad as the median stripe, extending from shoulder to rump. Except this short outermost band and the buff stripe, these longitudinal markings extend from middle of neck to rump. The buff stripe is continued forward along side of neck and under ear to cheek, where it spreads so as to surround eye, muzzle and lips. Behind eye there is a faint dusky line, and still more faint dusky wash extends over lower part of cheek and along side of neck between buff stripe and the darker color of the underparts. Ears tawny-ochraceous internally, black externally except for the conspicuous white tuft at tip; many of the hairs of this tuft white to extreme base. Whiskers black. Feet dull ochraceous. Underparts and inner surface of legs clear ochraceous-buff, slightly more yellow than that of Ridgway, the hairs slaty at base. Hairs of tail black at base and at extreme tip, the intermediate region occupied by a broad band of dull ochraceous, another of black, and a narrow subterminal area of yellowish-white. Pencil black slightly grizzled by numerous small yellowish annulations.

Skull and teeth.—The skull is smaller than that of *Sciurus barbei*, the diameter of the orbits and audital bullæ is less, and the rostrum is shorter. On the other hand, the interorbital width is fully as great as in the larger animal, and the lachrymal breadth is distinctly greater. The increased breadth of the region between the anterior zygomatic roots contrasted with the shorter rostrum gives the skull a very distinctive appearance as compared with that of *Sciurus barbei*. Teeth as in the Burman animal, but smaller throughout.

Measurements.—Measurements of type: total length, 210; head and body, 115; tail vertebræ, 95; hind foot, 30 (28); ear from meatus, 12; ear from crown, 8; width of ear, 8; skull, greatest length, 31 (33)*; basal length, 25 (27.8); length of nasals, 8 (9.4); interorbital breadth, 12 (12); lachrymal breadth, 16 (15.6); mandible, 17.4 (19).

Specimens examined.—Five, all from Trong, Lower Siam.

Remarks.—That this is not the same as the *Tamias leucotis* of Temminck is shown by the stress laid in the original description of the Malaccan animal on the presence of only one black longitudinal stripe. In one of Temminck's specimens the underparts were white slightly washed with reddish; in the other they appear to have been essentially as in the species found in Trong.

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*Cranial measurements in parenthesis are those of an adult male *Sciurus barbei* from Yado, Burma (No. 36,044).

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OF THE

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DESCRIPTION OF A NEW TELMATODYTES.

BY HARRY C. OBERHOLSER.

Two long-billed marsh wrens recently collected by the writer at Sabine, Texas, were at first referred, with a query, to *Telmatodytes palustris palustris.* In light of material, particularly from Louisiana, which Mr. Ridgway has brought together for use in connection with his work on the genus, these two specimens prove to belong to the new race which is here described.

Telmatodytes palustris thryophilus, subsp. nov.

Subspecific characters.—Similar to *Telmatodytes palustris marianæ*, but much paler, more grayish brown above, the pileum with much less black, often with almost none, the upper tail-coverts obsoletely or not at all barred; chest not spotted.

Geographical distribution.—Coast region of Louisiana and eastern Texas.

Description.—Type, male adult, No. 184,769, United States National Museum, Biological Survey Collection; Sabine, Texas, September 3, 1902; H. C. Oberholser.

Pileum sepia brown, laterally and posteriorly with a slight admixture of blackish; remainder of upper surface mummy brown, the back with an irregularly triangular area of black streaked with white; tail brown, with black bars that on many of the feathers are confluent; wings fuscous, barred with black, brown, and buff; a white superciliary stripe that is extended posteriorly in a chain of white streaks encircling the hind neck; postocular streak dark brown; sides of neck brown like the crown, but paler; cheeks and lores mixed white and brownish; lower surface white, the sides and flanks brownish ochraceous, also the breast tinged with this color; crissum brownish ochraceous, terminally whitish, and narrowly barred with dusky; lining of wing white.

This new form is most closely allied to *Telmatodytes palustris palustris*, from which its range is, however, widely separated, but it may be distinguished by its decidedly inferior size (being apparently a little smaller than even *T. p. marianæ*), duller, less reddish brown upper parts, besides having the brownish of sides and flanks spread over the breast and otherwise more extended. The type of *thryophilus* is in perfectly fresh autumn plumage, the condition which seems most nearly to resemble *palustris*, for summer specimens are paler, more grayish, and present a stronger contrast to *palustris* of even corresponding season.

The subjoined millimeter measurements of males of the three forms concerned in this comparison were taken by Mr. Ridgway, and he has courteously offered them for inclusion here.

Number of specimens.	Name.	Wing.	Tail.	Exposed culmen.	Tarsus.	Middle toe.
10	*Telmatodytes palustris palustris*	49.9	41.2	15.	20.4	12.9
4	*Telmatodytes palustris thryophilus*	47.4	40.4	13.1	20.1	13.6
7	*Telmatodytes palustris marianæ*	48.7	39.2	14.5	20.3	11.8

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF NEW BIRDS FROM SOUTHERN MEXICO.

BY E. W. NELSON.

The birds described below, with three exceptions, were obtained by Mr. Goldman and myself during our expedition in the interest of the Biological Survey, to southwestern Mexico, in the winter of 1902–1903. For favors extended during the preparation of this paper, I wish to express my appreciation to Mr. Robert Ridgway and Dr. Chas. W. Richmond, Curator and Assistant Curator of Birds, in the National Museum.

Geotrygon albifacies rubida, subsp. nov.

Guerrero Quail Dove.

Type.—No. 185,510 ♂ ad., U. S. Nat. Mus., Biological Survey Coll. From Omilteme, Guerrero, Mexico. Collected May 19, 1903, by E. W. Nelson and E. A. Goldman.

Distribution.—Heavily forested slopes on coast side of the Sierra Madre of Guerrero (above 5,000 feet).

Subspecific characters.—Generally paler than *G. albifacies*, with underparts more uniformly buff.

Description.—Generally similar to *G. albifacies*, but chestnut of upperparts paler, with a more yellowish cast; underparts nearly uniform buffy, a little darker on sides of body, with scarcely a trace of the ashiness on breast so commonly present in G. *albifacies*.

Dimensions of type.—Wing, 160; tail, 113; culmen, 16; tarsus, 43.

Remarks.—This form is based on eleven specimens all from the type locality.

Dactylortyx thoracicus sharpei, subsp. nov.

Yucatan Long-toed Grouse.

Type.—No. 167,737, ♂ ad., U. S. Nat. Mus., Biological Survey Coll. From Apazote, Campeche, Mexico. Collected December 31, 1900, by E. W. Nelson and E. A. Goldman.

Distribution.—The Peninsula of Yucatan, including the States of Campeche and Yucatan (below 1,000 feet).

Subspecific characters.—Smaller than *D. thoracicus*; white area on abdomen larger; color of breast, flanks, top of shoulders, back and upper surface of wings paler; cheeks and superciliary stripe of type deeper and richer cinnamon rufous and top of head richer and brighter chestnut brown than in any male seen of other races of this species.

Dimensions of type.—Wing, 122; tail (?); culmen, 16; tarsus, 35.

Remarks.—In the Biologia, Vol. III, p. 309, Dr. Sharpe first called attention to the small size and paler colors of these grouse from Yucatan. Three specimens in our collection from Campeche agree with the Yucatan birds in these characters, and evidently represent a recognizable geographic race peculiar to the arid peninsula of Yucatan, which I take pleasure in dedicating to Dr. Sharpe.

In this connection I wish to record the confirmation of the validity of *Dactylortyx devius*, Nelson, by a series of 13 specimens taken by Mr. Goldman and myself at Omilteme, Guerrero, during May, 1903. It is altogether probable that specimens from intermediate territory will show that this is merely a well-marked geographic race of *D. thoracicus.*

Syrnium occidentale lucidum, subsp. nov.

Mexican Spotted Owl.

Type.—No. 185,269, ♀ ad., U. S. Nat. Mus., Biological Survey Coll. From Mt. Tancitaro, Michoacan, Mexico. Collected February 27, 1903, by E. W. Nelson and E. A. Goldman.

Distribution.—Known only from the forested mountains about the southern end of the Mexican tableland (above 6,500 feet).

Subspecific characters.—Darker and with much less yellowish buffy suffusion throughout than in *S. occidentale;* white markings larger and clearer white.

Description of type.—Light markings as in *S. occidentale* but larger, clearer white and much more distinct; main color on top and sides of head, neck, body and underparts dark sepia brown, contrasting strongly with the duller mummy brown of typical *S. occidentale;* the suffusion of yellowish-buffy, so marked in the latter, mainly absent or much reduced in present form; face dingy gray with scarcely a trace of buffy; legs, feet and toes whiter and more thickly spotted with brown; size about as in *S. occidentale.*

Dimensions of type.—Wing, 330; tail, 214; culmen, 35; tarsus, 63.

Remarks.—This form is based on a single specimen, but the National Museum has received another from the State of Guanajuato, Mexico, which is not at present accessible.

The shade of brown of *S. o. lucidum* approaches more nearly to that of *S. o. caurinum* than to that of typical *occidentale*, yet owing to the greater intensity of the buffy suffusion and the small size of the white spots on both upper and under parts of *S. o. caurinum* it is much more distinct from *lucidum* than is *occidentale.* The white spots throughout in *S. o. lucidum* average about twice as large as those in *S. o. caurinum*; while the gray face and general suppression of buffy in the Mexican bird show strongly on comparison with *caurinum.*

Xiphocolaptes emigrans omiltemensis, subsp. nov.

Omilteme Wood-hewer.

Type.—No. 185,530, ♂ ad., U. S. Nat. Mus., Biological Survey Coll. From Omilteme, Guerrero, Mexico. Collected May 19, 1903, by E. W. Nelson and E. A. Goldman.

Distribution.—Oak forests on south slope of the Sierra Madre of central Guerrero, near Omilteme (above 6,000 feet).

Subspecific characters.—Most like *X. emigrans sclateri* from which it differs in the duller, dingier shades of brown above and below, lacking most of the yellowish mixture so conspicuous in *sclateri*; white throat patch smaller, and white shaft lines on neck and breast narrower, fewer and more obsolescent posteriorly; white on throat and shaft streaks on upper and lower parts dingier white than in *sclateri* and less sharply contrasted with other colors. Size about as in *sclateri*, including length and proportions of bill.

Remarks.—The authors of the "Biologia" (Vol. II, pp. 183–184), have treated *Xiphocolaptes sclateri* as a synonym of *X. emigrans.* With eight specimens of the latter before me, two specimens (including type) of *sclateri* and four of *omiltemensis*, the specimens of *sclateri* may at once be distinguished from the series of *emigrans* by their longer and more slender bills, they also have the whitish area on the chin and throat less streaked, while the whitish shaft streaks on crown and breast are rather broader and more strongly marked.

Cyanolyca mirabilis, sp. nov.

Omilteme Jay.

Type.—No. 186,545, ♂ ad., U. S. Nat. Mus., Biological Survey Coll. From Omilteme, Guerrero, Mexico. Collected May 22, 1903, by E. W. Nelson and E. A. Goldman.

Distribution.—Known only from type locality in the oak forests on the Sierra Madre of Central Guerrero (above 7,000 feet).

Specific characters.—A narrow band of silvery white extends across forehead and back over eyes and behind ear coverts, to unite with large white area covering chin, throat, and under side of neck; rest of head, neck and upper breast black; rest of upper parts and under side of body blue.

Description.—A band of silvery white, 2 to 3 mm. broad, extends across forehead between fore part of orbits and thence back over eyes, along sides of crown and down behind ear coverts, to unite with a large silvery-white area covering throat and under side of neck; rest of head, neck and fore breast uniform black; back, including upper surface of wings and tail and under side of body, dull indigo blue; under side of wings dark hair brown; under side of tail brownish black.

Dimensions of type.—Wing, 110; tail, 118; culmen, 23; tarsus, 34.

Remarks.—The discovery of this remarkable species, the handsomest and most strikingly marked one of the genus, was one of the unexpected results of our visit to the rich bird district about Omilteme. So many rare and interesting species were taken during our brief stay that it is evident this locality would repay more careful work. The Omilteme jay, of which our collection contains 8 specimens, is so different from any of its known congeners that no comparison between them is needed. Its size is very similar to that of *C. pumilo.*

Aphelocoma guerrerensis, sp. nov.

Guerrero Jay.

Type.—No. 185,539, ♂ ad., U. S. National Museum, Biological Survey Collection, from Omilteme, Guerrero, Mexico. Collected May 19, 1903, by E. W. Nelson and E. A. Goldman.

Distribution.—Humid oak forest on west slope of the Sierra Madre of central Guerrero, Mexico (above 7,000 feet).

Specific characters.—Head and body uniform rich dark blue (between hyacinth and Berlin blue of Ridgway). Size larger than *Aphelocoma unicolor.*

Description.—Entire head, body, with upper surface of wings and tail rich dark blue (of a shade between hyacinth and Berlin blue of Ridgway); inner web and under surface of quills brownish black, a little darker than in *A. unicolor*; under side of tail coal black (much darker than in *A. unicolor*), with faint wash of blue in certain lights.

Measurements of Aphelocoma guerrerensis and A. unicolor.

Name.	Wing.	Tail.	Culmen.	Tarsus.
Type of *Aphelocoma guerrerensis.*	172	174	33	42
Aphelocoma unicolor, ♂ ad., No. 144,679, U. S. N. M., Jico, Vera Cruz, Mex., July 14, 1893.	170	161	29	42

Remarks.—The distribution of color in *Aphelocoma guerrerensis* and *A. unicolor* is the same, but the differences in size, proportions, and intensity of color between our series of the two forms are very constant. This being the case and in view of the isolation of the habitat of *A. guerrerensis*, it appears best to treat this form as a distinct species although evidently derived from *A. unicolor.*

A. guerrerensis is based upon a series of 11 specimens.

Vireolanius melitophrys goldmani, subsp. nov.

Goldman's Shrike Vireo.

Type.—No. 186,309, ♀ ad., U. S. Nat. Mus., Biological Survey Coll. From Huitzilac, Morelos, Mexico. Collected June 10, 1903, by E. W. Nelson and E. A. Goldman.

Distribution.—Oak forest on south slope of the mountains bordering south side of Valley of Mexico, in States of Mexico and Morelos (7,000 to 9,000 feet).

Subspecific characters.—Larger and generally paler than typical *V. melitophrys* with heavier black stripe on sides of throat: chestnut-rufous band across breast only, this color replaced along sides by wash of dull buffy.

Description of type.—Forehead dingy gray shading back into darker more slate gray on nape, back and sides of neck; gray of neck shading into color of back on shoulders without any definite limit between two areas; back, top of wings and rump light olive green; tail, slate gray washed above with color of rump; superciliary stripe lemon yellow becoming white posteriorly; broad stripe extending through eye and back over ear coverts, dark slate gray; broad white malar stripe extends back across cheeks to unite with area of same color covering chin, throat and underside of neck; this area overlaid with a faint wash of buffy. Well defined black stripe (heavier than in true *melitophrys*), extends from angle of lower mandible back along sides of chin and throat, thus outlining white malar stripe; band across forepart of breast light ferruginous chestnut; sides of body dull grayish; middle of breast, abdomen and under tail coverts dull white with a strong wash of buffy along each side, and a much lighter suffusion of same over middle of white underparts; tail below slate gray with narrow white tips to feathers.

Measurements of Vireolanius melitophrys and V. m. goldmani.

Vireolanius melitophrys goldmani.	Wing.	Tail.	Culmen.	Tarsus.
Ad. ♀ type.	85	73	18	25
Ad. ♀ from "near City of Mexico."	84.5	73	19	26
Yg. ♂ from type locality.	86	72.5	16	26
Vireolanius melitophrys.				
Ad. ♂ from Jico, near Jalapa, Vera Cruz.	81	69	20	25

Remarks.—The family to which *Vireolanius* belongs is distinguished by the identity of the sexes in color, and for this reason I have felt sufficiently confident that the well marked differences in color between the female specimens, from the mountains south of the Valley of Mexico, and our typical male from near Jalapa, Vera Cruz cannot well be considered due to sex. This conclusion is supported by the well marked differences of size—the three specimens of *goldmani* (including an immature male) are all larger than the typical male of *melitophrys*, and have shorter bills.

In the "Biologia" (Vol. I, p. 209), the authors describe a female of *V. melitophrys* from the Volcan de Fuego, Guatemala, as different from the male from the same locality. The distinguishing characters of the female in this description so closely parallel the characters, in which the immature male of *V. m. goldmani* differs from the females, that it appears a fair inference that the Volcan de Fuego female is an immature bird, and the differences due to immaturity and not to sex.

Geothlypis chapalensis, sp nov.

Chapala Yellow-throat.

Type.—No. 186,409, ♂ ad., U. S. Nat. Mus., Biological Survey Coll. From Ocotlan, Jalisco, Mexico. Collected June 26, 1903, by E. W. Nelson and E. A. Goldman.

Distribution.—Fresh-water marshes along lower Lerma River and eastern border of Lake Chapala (from near La Barca to Ocotlan), Jalisco, Mexico.

Specific characters.—Pattern of coloration as in *G. melanops*, but black mask extends higher up on forehead; light area bordering black mask yellow; upperparts darker olive-green; underparts richer yellow; culmen, tail, and tarsus longer.

Description.—A broad black mask covering front and sides of head including orbits; black mask bordered posteriorly by a yellow band extending about to middle of crown and down on sides of neck; rest of crown and nape bistre brown overlying and concealing yellow bases of feathers; rest of upperparts dark olive green; underparts bright gamboge yellow most intense on neck and breast; flanks washed with olive brown.

Measurements of three species of Geothlypis.

Name.	Wing.	Tail.	Culmen.	Tarsus.
Type of *G. chapalensis*, ad. ♂.	61	63	14	23
G. melanops, ad. ♂.	62	61	13	22
G. flaviceps, ad. ♂.	57	56	15	22

Remarks.—In fresh plumage the brown on crown and nape hides the basal yellow of the feathers, but as the plumage becomes worn the brown gradually disappears and the yellow band on crown broadens until in one of our series of eleven specimens the crown and nape are entirely yellow much as in *G. flaviceps*. The differences in size and proportions serve at once to distinguish the two species and the same holds good in regard to another closely related species, *G. flavovelatus*.

The female of *G. chapalensis* has a dull brown forehead and dull olive green crown, contrasting strongly with the yellow forehead and lighter green crown of this sex in *G. flaviceps*.

This species is based on eleven specimens.

Thryophilus sinaloa russeus, subsp. nov.

Russet Wren.

Type.—No. 185,893, ad. ♂, U. S. Nat. Mus., Biological Survey Coll. From Acahuizotla, Guerrero, Mexico. Collected May 9, 1903, by E. W. Nelson and E. A. Goldman.

Distribution.—Known only from type locality, but probably occurs in brushy foothills of the Sierra Madre del Sur throughout most of its extension in Guerrero.

Subspecific characters.—Differs from *T. sinaloa* mainly in the much brighter, more russet brown of upperparts of head, body, and wings; upper tail coverts and tail brighter, more cinnamon rufous; dark bars on wings and tail and under tail coverts blacker and more strongly contrasted with the brown; size about as in typical *sinaloa*.

Remarks.—This subspecies is based upon five specimens. Typical *T. sinaloa* is exactly intermediate in coloration between *russeus* and *cinereus*.

Troglodytes brunneicollis nitidus, subsp. nov.

Zempoaltepec Wren.

Type.—No. 143,058, ♂ ad., U. S. Nat. Mus., Biological Survey Coll. From Mt. Zempoaltepec, Oaxaca, Mexico. Collected July 8, 1894, by E. W. Nelson and E. A. Goldman.

Distribution.—Humid forests on Mount Zempoaltepec, Oaxaca, and adjacent parts of the Cordillera in northeastern Oaxaca (above 6,500 feet).

Subspecific characters.—Both adults and young differ from typical *T. brunneicollis* in the deeper, or darker, reddish bistre-brown of upperparts, and the darker and richer buffy-cinnamon on neck and breast; size about the same.

Remarks.—This subspecies, based on two adults and one young of the year, from the very humid forest on Mount Zempoaltepec, shows the influence of the environment in its darker colors compared with *T. brunneicollis*, the type of which was taken in the more open and arid pine and fir forest of the mountains at La Parada near Oaxaca City, central Oaxaca.

Henicorhina leucophrys festiva, subsp. nov.

Guerrero Wren.

Type.—No. 186,596, ♂ ad., U. S. Nat. Mus., Biological Survey Coll. From Omilteme, Guerrero, Mexico. Collected May 23, 1903, by E. W. Nelson and E. A. Goldman.

Distribution.—Heavy oak forested mountain slopes of the Cordillera of western Michoacan and central-southern Guerrero (above 7,000 feet).

Subspecific characters.—Intermediate in coloration between *H. leucophrys mexicana* (Nelson) and *H. leucophrys capitalis* Nelson, but most like the former from which it differs mainly in having crown, top of neck and fore part of shoulders bistre brown; rest of back and rump slightly duller shade of rusty rufous; bill longer.

Remarks.—The color of crown and top of neck in this form contrasts more strongly with the rusty rufous of the rump than in *mexicana*, and like the latter it shows no sign of the darker line on the sides of the crown of *H. l. capitalis*.

Hemiura leucogastra musica, subsp. nov.

Palenque Wren.

Type.—No. 166,306, ♂ ad., U. S. Nat. Mus., Biological Survey Coll. From Teapa, Tabasco, Mexico. Collected March 20, 1900, by E. W. Nelson and E. A. Goldman.

Distribution.—Humid forests along base of Cordillera from Tabasco to northern Guatemala.

Subspecific characters.—Darkest of the subspecies of *H. leucogastra*; most like *H. l. brachyura* from which it differs in darker shade of reddish brown on upperparts, flanks and under tail coverts, and the obsolescence of bars on tail and under tail coverts, as in typical *leucogastra*.

Sialia mexicana australis, subsp, nov.

Southern Bluebird.

Type.—No. 185,183, ♂ ad., U. S. Nat. Mus., Biological Survey Coll. From Mt. Tancitaro, Michoacan, Mexico. Collected February 26, 1903, by E. W. Nelson and E. A. Goldman.

Distribution.—Wooded mountains on southern border of the Mexican tableland; From Mt. Orizaba, Puebla, west through Puebla (Tochimilco), Mexico (Mt. Popocatapetl), Morelos (Huitzilac), Michoacan (Mt. Patamban and Mt. Tancitaro) to the Sierra Nevada de Colima in southern Jalisco. Breeds above 6,000 feet.

Subspecific characters.—Most like *S. m. occidentalis* but larger (largest of the subspecies of *S. mexicana*). Males with rufous areas lighter, more cinnamon colored, and blue of upperparts richer or more intense than in *occidentalis* (nearly as in true *mexicana*); females with top of head, neck and rump deeper blue, rest of back and shoulders darker brown.

Dimensions of type.—Wing, 112; tail, 68; culmen, 13; tarsus, 22.

VOL. XVI, PP. 161-164 NOVEMBER 30, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF TWO NEW MOLE RATS.

BY GERRIT S. MILLER, JR.

[By permission of the Secretary of the Smithsonian Institution.]

Among the Old World rodents in the United States National Museum are two forms of *Spalax*, which I am unable to identify with any of the species recently characterized by Nehring and Satunin. One is from northern Dobrudscha, the other from Beyrout, Syria. They may be described as follows:

Spalax dolbrogeæ, sp. nov.

Type.—Adult male (skin and skull), No. 122,109, United States National Museum. Collected at Malcociu, Dobrudscha, Rumania, March 20, 1903. Received from Wilhelm Schlüter of Halle, a. S., Germany.

Characters.—A medium sized species nearly as large as *Spalax microphthalmus*, which it resembles in the form of the molar teeth, but from which it differs conspicuously in the much larger parietal bones.

Color.—Back, sides, and posterior half of head ochraceous-buff, slightly paler than that of Ridgway, the fur everywhere slate-gray beneath surface. Underparts and legs slate-gray, the color of sides extending as a distinct wash across middle of body. Face, cheeks, and region about mouth silvery drab-gray, the two lines of bristle-like hairs extending back from muzzle whitish in rather marked contrast.

Skull.—In general form the skull rather closely resembles that of *Spalax microphthalmus* as figured by Nehring, but the lambdoid ridge is almost straight, and each parietal bone is nearly as broad as long, and in size fully equal to the two together in the skull of the larger animal.

Anteriorly the two bones form a single point, and the latero-anterior border is continued backward almost to lambdoid crest, so that the outline of the bone is very nearly a right triangle. Sagittal crest well developed. Anterior margin of frontal straight.

Teeth.—The teeth agree with those of *Spalax microphthalmus*, as described by Nehring*, except that each of the first and second upper molars has an enamel island in the anterior loop, making the pattern an exact reversal of that in the first and second lower molars of *Spalax hungaricus.*† In all of the teeth the pattern is essentially alike, and consists of a single narrow reentrant fold on each side. The inner reentrant is placed a little in advance of the outer, and is curved forward, while the outer curves back. In the maxillary teeth the folds are all open, but in the lower jaw those of the inner side are closed. The anterior faces of the incisors both above and below are finely roughened by minute longitudinal wrinkles, but there are no distinct grooves.

Measurements.—Head and body, 230; hind foot 29 (25); skull, greatest length, 52; basal length, 45; basilar length, 42; occipito-nasal length (from inion), 41; palatal length, 26; diastema, 19; length of nasals, 19; breadth of both nasals together anteriorly, 7; breath of both nasals together posteriorly, 2.6 ; greatest breadth of rostrum, 11.4; zygomatic breadth, 38 ; mastoid breadth, 26; least interorbital breadth, 6; palatal breadth between middle molars, 2; depth at middle of palate, 18.4; least depth of rostrum behind incisors, 7; mandible from condyle, 31; mandible, from root of incisor, 32; depth of mandible through coronoid process, 18.8; upper molars, alveoli, 7.6; upper molars, crowns, 6.6; width of second upper molar (crown), 2.8 ; lower molars, alveoli, 7 ; lower molars, crowns, 6.6 ; width of upper incisor at alveolus, 3 ; width of lower incisor at alveolus, 3.4.

Specimens examined.—One, the type.

Remarks.—This is probably the same animal as the Rumanian *Spalax hungaricus* recorded by Matschie, in 1901.‡ It is readily distinguishable from the Hungarian species, however, by its much larger size and by the presence of an inner reentrant enamel fold in the posterior molar both above and below. *Spalax dolbrageæ* is apparently more closely related to *S. microphthalmus.*

Spalax berytensis, sp. nov.

Type.—Adult female (skin and skull), No. $\frac{18009}{36859}$, United States National Museum. Collected at Beyrout, Syria, April, 1878, by W. T. Van Dyck.

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* Sitz.-Ber. Gesellsch. naturforsch. Freunde zu Berlin, 1897, p. 165.

† In the posterior loop of the left middle lower molar there is a very minute enamel island whose presence may be abnormal.

‡ Sitz.-Ber. Gesellsch. naturforsch. Freunde zu Berlin, 1901, p. 237. Prundu, Rumania.

Characters.—A medium sized species, not as large as *Spalax dolbrogeæ*. Face of incisors without distinct grooves. Enamel pattern essentially as in *Spalax kirgisorum*; posterior upper molar with no reentrant enamel fold on inner side, posterior lower molar with a deep fold on each side. Skull broad and robust, without special elongation of rostrum.

Color.—In color the type resembles that of *Spalax dolbrogeæ* so closely as to require no special description. In two half grown young the mouse-gray of the muzzle is extended back over most of head, while in an old, much abraded male the light tips of the hairs are so much worn away that the whole animal is a dirty plumbeous brown.

Skull.—The skull of an old male with much worn teeth rather closely resembles that of *Spalax dolbrogeæ*, but is not as large. The more noticeable details of form in which it differs from the Dobrudschan animal are as follows: The rostrum is not distinctly swollen at roots of incisors; the anterior zygomatic roots flare less abruptly; the posterior margin of antorbital foramen is extended further backward, so that the foramen appears larger when skull is viewed from above; the anterior outline of the frontals is conspicuously angular-emarginate; the parietal is rhomboid, its length under lambdoid crest nearly double that of anterior margin; the basioccipital is narrower in proportion to its length; the tubular portion of the audital bulla is better developed. In the type the same characters are apparent, except that the interparietal is wider along anterior suture.

Teeth.—Enamel pattern of molars similar to that of *Spalax kirgisorum* as figured and described by Nehring,* but with angles less sharp-pointed. First upper molar with well developed reentrant fold on inner side and two rather deeper folds on the outer side, the inner and the anterior outer almost meeting. Second upper molar with a deep fold on each side and a large enamel island opposite point of inner fold. Third upper molar entire on inner side, cut on outer side by two reentrant folds, of which the anterior is minute and inconspicious, the posterior deep and provided with a short posterior and long anterior curved off-shoot, the two off-shoots together forming a crescent parallel with inner edge of tooth. Each lower molar has a single deep reentrant fold on outer side. The first has two folds on inner side, the outer abruptly bent forward, the posterior slightly curved backward. The second has one reentrant angle on inner side. The third is provided with a deep anterior and a minute posterior fold. A large enamel island lies in posterior loop of second lower molar. Anterior faces of incisors finely roughened by minute, irregular, longitudinal folds. They show no trace of definite grooves, but the folds tend to form barely perceptible longitudinal ridges, three or four in number.

Measurements.—External measurements of type (from skin): Head and body, 130; hind foot, 24 (21). External measurements of old male from type locality: Head and body, 190; hind foot, 28 (24).

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* Sitz.-Ber. Gesellsch. naturforsch. Freunde zu Berlin, 1897, p. 177, fig. 4 (p. 175).

Cranial measurements of type: Greatest length, — (49*); basal length. — (44.4); basilar length, — (40.4); occipito-nasal length (from inion). 30.4 (39); palatal length, 22 (29.4); diastema, 12 (17); length of nasals, 15 (20); breadth of both nasals together anteriorly, 5.2 (6.8); breadth of both nasals together posteriorly, 1.8 (2.8); greatest breadth of rostrum, 7.4 (10); zygomatic breadth, 27.2 (35); mastoid breadth, 22 (26); least interorbital breadth, 7 (6.4); palatal breadth between middle molars, 1.8 (2.4); depth at middle of palate, 13.4 (18.8); least depth of rostrum behind incisors, 5 (7); mandible from condyle, 24.8 (31); mandible from root of incisor, 24.6 (30); depth of mandible through coronoid process, 12.8 (17.6); upper molars, alveoli, 7.8 (8); upper molars, crowns, 8 (7); width of second upper molar (crown), 2.2 (2.8); lower molars, alveoli, 7.6 (7); lower molars, crowns, 6.4 (7); width of upper incisor at alveolus, 1.8 (2.6); width of lower incisor at alveolus, 1.8 (2.6).

Specimens examined.—Four, all from the vicinity of Beyrout.

Remarks.—In dental characters this species appears to be much like *Spalax kirgisorum*, an animal from which it differs very conspicuously in the large size and robust form of the skull. From its near geographic allies, *Spalax ehrenbergi* and *Spalax intermedius* it is also readily distinguishable; from the former by the absence of a reentrant fold on the inner side of the third upper molar and by the presence of only one fold on inner side of middle lower tooth; from the latter by the longer parietals (7 mm. instead of 5 mm. along sagittal crest), and by the absence of distinct grooves on the face of the incisor teeth.

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* Measurements in parenthesis are those of an adult male (much older than the type) from the same locality (No. $\frac{36858}{13008}$).

VOL. XVI, PP. 165-166 NOVEMBER 30, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A SECOND SPECIMEN OF EUDERMA MACULATUM.

BY GERRIT S. MILLER, JR.

[By permission of the Secretary of the Smithsonian Institution.]

One of the most remarkable of North American bats, the huge-eared, black-and-white *Euderma maculatum* (J. A. Allen), was wholly unknown before 1890, and, after its discovery, it eluded detection again for thirteen years. The original specimen, now in the American Museum of Natural History, was captured by Mr. Thomas Shooter, on a fence at the mouth of Castac Creek, near Piru, Ventura County, California, in March, 1890. It remained unique until a second individual was found dead in the Biological Laboratory of the New Mexico College of Agriculture and Mechanic Arts, at Mesilla Park, New Mexico, in September, 1903. This specimen, correctly identified, was presented to the United States National Museum, by Professor E. O. Wooton. It is an adult male preserved in alcohol, and bears the number 122,545. The history of this species is a

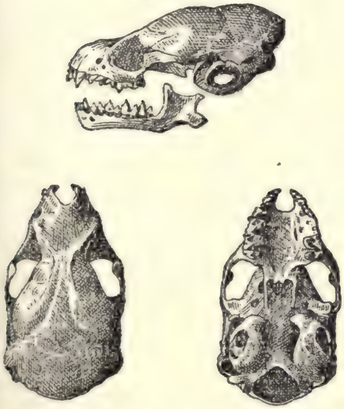

FIG. 1. Skull of *Euderma maculatum* (x 1½).

striking illustration of the uncertainty that attends the study of bats. The animal occurs in a region that has recently been the field of the most systematic biological explorations ever carried on in any country, yet only two individuals have been taken, and both of these were procured by persons not specially interested in mammals. All that trained collectors have added in more than a decade to our knowledge of *Euderma* is the vague secondhand report that the Vegas Valley, Nevada, is visited during hot weather by a large bat with jackass ears and white shoulder stripes.*

Through the kindness of Dr. J. A. Allen, I have been enabled to compare the Mesilla Park specimen with the type. In every way the individuals closely agree, even to minute details of size. The measurements of the two are as follows, those of the type in parenthesis: Total length, 107 (110); head and body, 60 (60); tail, 47 (50); tibia, 19.6 (21); foot, 9.8 (9); forearm, 49.6 (50); thumb, 9 (6.8); second digit, 42 (—); third digit, 86 (91); fourth digit, 72 (76.2); fifth digit, 64 (67.3); ear from meatus, 41 (34); ear from crown, 43 (—); width of ear, 25 (22); tragus, 14 (13); greatest width of tragus, 5 (5); skull, greatest length, 18.8 (19); basal length, 18; basilar length 16 (16.5); zygomatic breadth, 10.4 (10.9); greatest breadth of braincase above roots of zygomata, 9.4; greatest diameter of audital bulla, 5.8 (5.8); mandible, 12.6 (12.7); maxillary toothrow, exclusive of incisors (alveoli), 6; maxillary toothrow, including incisors (alveoli), 6.8 (6.8); mandibular toothrow, exclusive of incisors (alveoli), 6.4; mandibular toothrow, including incisors (alveoli), 7.2 (7.6). The species has been so thoroughly described that there appear to be no further important characters to note. The skull, however, has never before been figured, and that of the type is lost.

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*North American Fauna, No. 13, p. 49. October 16, 1897.

VOL. XVI, PP. 167-170 NOVEMBER 30, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DIAGNOSES OF NINE NEW FORMS OF AMERICAN BIRDS.

BY ROBERT RIDGWAY.

[By permission of the Secretary of the Smithsonian Institution.]

The following new forms are included in Part III of "Birds of North and Middle America" and are additional to those already published in these "Proceedings," pages 105 to 111, September 30, 1903.

Thryophilus pleurostictus ravus, new subspecies.

Similar to *T. p. pleurostictus* but smaller, color of back, etc., more rufescent, secondaries less distinctly barred, and median underparts more broadly white.

Western Nicaragua; western Costa Rica?

Type, No. 89,701, Coll. U. S. Nat. Mus., adult male; San Juan del Sur, Nicaragua, January 17, 1883; C. C. Nutting.

Thryophilus modestus pullus, new subspecies.

Similar to *T. m. modestus* but darker and browner.

State of Chiapas, southern Mexico; Guatemala.

Type, No. 142,928, Coll. U. S. Nat. Mus. (Biological Survey Collection), adult male; Huehuetan, Chiapas, February 29, 1896; Nelson and Goldman.

Salpinctes obsoletus notius, new subspecies.

Similar to *S. o. obsoletus* but smaller, with larger bill and feet.

Southern Mexico.

Type, No. 142,868, Coll. U. S. Nat. Mus. (Biological Survey Collection), adult male; Tlalpam, Federal District, Mexico, December 8, 1892; E. W. Nelson.

Henicorhina leucophrys castanea, new subspecies.

Similar to *H. l. collina* (Bangs) but back darker chestnut, flanks brighter chestnut, and bill smaller (exposed culmen 13.5 instead of 14.5–16).

Eastern Guatemala.

Type, No. 39,563, Coll. Am. Mus. Nat. Hist. (Lawrence Collection); Guatemala.

Henicorhina leucophrys berlepschi, new subspecies.

Similar to *H. l. leucophrys* but pileum sooty brown with black lateral margin, instead of black slightly washed with sooty medially; black postocular stripe narrower.

Western Ecuador (Chimbo; Pedregal).

Type in Coll. Am. Mus. Nat. Hist., Chimbo, western Ecuador, November, 1882; F. de Siemiradzki.

=*Henicorhina hilaris* Berlepsch and Taczanowski, Proc. Zool. Soc. Lond., 1884, 284, part (specimen from Pedregal).

=*Henicorhina leucophrys* (not *Troglodytes leucophrys* Tschudi) Berlepsch and Taczanowski, Proc. Zool. Soc. Lond., 1883, 539 (Chimbo, western Ecuador; crit.).

Henicorhina hilaris bangsi, new subspecies.

Similar to *H. h. anachoreta* (Bangs) but darker and duller brown above, the pileum and hindneck sooty brown instead of olive; tail darker brown, more narrowly and less regularly barred with dusky; bill larger (exposed culmen 14–16, instead of 12.5–14).

Mountains of Santa Marta, Colombia, 3000–8000 ft. altitude.

Type, No. 163,791, Coll. U. S. Nat. Mus., adult male; San Francisco, Province of Santa Marta, Colombia, June 1, 1898; W. W. Brown, Jr. (Received from Outram Bangs.)

=*Henicorhina leucophrys* (not *Troglodytes leucophrys* Tschudi) Bangs, Proc. Biol. Soc. Wash., XII, 1898, 160, 181 (Pueblo Viejo, San Francisco, Palomina, and San Miguel, Colombia); Proc. New Engl. Zool. Club, I, 1899, 83, 84 (crit.; descr.). Allen, Bull. Am. Mus. Nat. Hist., XIII, 1900, 180 (Valparaiso and El Libano, Colombia).

Cistothorus polyglottus lucidus, new subspecies.

Similar to *C. p. elegans* but coloration brighter, more rufescent; adults with white streaks on back broader, more purely white; young with general color more strongly rufescent (the rump and upper tail-coverts dull russet or cinnamon instead of wood brown, the sides, flanks, and under tail-coverts cinnamon or deep buffy cinnamon, instead of pale wood brown); tail larger.

Isthmus of Panama (Boquete, Chiriqui).

Type, No. 8624, Coll. E. A. and O. Bangs; adult male, Boquete, Chiriqui, Panama, April 25, 1901; W. W. Brown, Jr.

=*Cistothorus polyglottus elegans* (not *C. elegans* Sclater and Salvin) Bangs, Proc. New Engl. Zool. Club, III, 1902, 53 (Boquete).

Salpinctes obsoletus exsul, new subspecies.

Similar to *S. o. pulverius* Grinnell but coloration darker; differing from *S. o. obsoletus* in having lateral rectrices more extensively barred with cinnamon-buff, shorter wing, longer tail, and larger feet.

San Benedicto Island, western Mexico.

Type, No. 117,502, Coll. U. S. Nat. Mus., adult male, San Benedicto Island, Revillagigedo group, western Mexico, March 10, 1889; C. H. Townsend.

Salpinctes maculatus, new subspecies.

Similar to *S. fasciatus* Salvin and Godman but flanks barred with dark brown, instead of black, the bars narrower.

Northern Guatemala.

Type, No. 150,904, Coll. U. S. Nat. Mus., adult male; Toyabaj, Department of Quiché, northern Guatemala, May 7, 1892; Heyde and Lux.

VOL. XVI, PP. 171-176 DECEMBER 31, 1903

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DIAGNOSES OF NEW SPECIES OF MOLLUSKS FROM THE SANTA BARBARA CHANNEL, CALIFORNIA.

BY WILLIAM HEALEY DALL.

During the past summer Mr. Herbert N. Lowe and Mr. John H. Paine, with the aid of a gasoline launch, did some dredging in the Santa Barbara Channel near Avalon, Catalina Island. The depth of water was from 40 to 60 fathoms.

The result of this work, by two enthusiastic young collectors, has been very interesting, two genera not before known to inhabit the coast having been discovered, represented by two species, both new, one of which, *Metzgeria californica*, has already been described elsewhere by the writer.

The following species, from among those sent to the writer for identification, appear to be new, and diagnoses of them are now provided. The presence of so many novelties gives some idea of the richness of the molluscan fauna of this region, and indicates that many more forms probably remain to be discovered in the same vicinity. When not otherwise stated the locality is as above mentioned, and all except *Mitra dolorosa*, are represented in the collection of the gentlemen named.

Mrs. Lydia Emerson Fancher and Mrs. Lillie J. Sawin assisted in the search for mollusks and at the request of Mr. Paine two of the species have been named in honor of these ladies.

Actæon (Rictaxis) painei sp. nov.

Shell with one smooth, polished nuclear and three or more subsequent strongly sculptured whorls; apex sinistral, immersed; spire very short and blunt; body stout, ovate, slightly peripherally flattened; sculpture of strong, subequal, spiral riblets, covering the whole shell, separated by slightly narrower, coarsely punctate channels; outer lip sharp; pillar obliquely subtruncate in front, twisted, vertical, with a prominent plait-like edge, and a moderately prominent plait about midway of the exposed portion; body with a very thin wash of callus; color of the shell yellowish subtranslucent white. Length of shell, 8.0; of aperture, 7.25; max. breadth of shell, 5.0 mm.

This is immediately distinguishable from *A. punctocoelata* Cpr., by its short spire, stouter form, and absence of the blackish color bands. The specimen described seems not quite mature. It is No. 109,301, U. S. National Museum.

Clathurella lowei sp. nov.

Shell translucent white, with a brownish-pink flush on the spire and base; nucleus smooth, polished, rounded, and rather inflated, of one whorl; subsequent whorls, five (or more), sculptured with (on the penultimate whorl 13) short axial riblets, slightly oblique with narrower interspaces, the riblets confined to the peripheral part of the whorl and separated from the suture behind by the spirally striated anal fasciole; spiral sculpture covering the whorl, of slender flattish threads with wider interspaces, one thread at the shoulder more prominent than the rest, forming a wavy keel over the riblets; suture inconspicuous, closely appressed; aperture narrow, canal short, anal sulcus shallow, close to the suture; outer lip prominent, thickened, the edge sharp and incurved; canal short, slightly recurved, pillar lip smooth. Length of shell, 7.7; of last whorl, 5.0; max. diameter of shell, 3.3 mm. Another specimen is 9 mm. long.

This species resembles *Glyphostoma* but has, in the specimens seen, no sculptured callus on the pillar lip. It is not closely like any of the species hitherto known from the coast. It is possible that still older specimens might show some granulation on the inner lip. The type is No. 109,302, U. S. National Museum.

Mangilia fancheræ sp. nov.

Shell slender, elongate, of a dark reddish-brown when fresh; nucleus somewhat swollen, smooth, of about two whorls; subsequent whorls about six or seven, similarly sculptured; axial sculpture of numerous low slender flexuous riblets with wider interspaces, extending from the suture to the periphery and obsolete on the base of the shell; these are crossed (between the sutures) by from four to six spiral subequal threads, of which those on the periphery are somewhat more prominent, and all are slightly nodulous where they over-ride the riblets; on the base there are about 15 of these threads with somewhat wider interspaces; aperture rather narrow, outer lip sharp, flexuous, the anal sulcus wide and shallow, half way between the suture and the periphery; pillar lip smooth, canal rather long, straight, and open. Length of shell, 10.5; of last whorl, 6.0; max. diameter of shell, 3.0 mm.

The sculpture of this shell recalls "*Drillia*" *cancellata* Carpenter of the northern fauna, but this species is smaller, more slender and more delicately ornamented and there seems to be no operculum. The type is No. 109,303, U. S. National Museum.

Mitra lowei sp. nov.

Shell of a warm yellow-brown with a whitish apex; nucleus subtrochiform, smooth, solid, of about three conical whorls; subsequent whorls (in the type specimen) about four, rapidly increasing in diameter; those which immediately succeed the nucleus marginated in front of the suture by two or three fine spiral grooves, the interspaces of which stand up like threads, but these gradually become less pronounced and hardly noticeable on the fourth whorl where the sculpture becomes on the periphery fine, very inconspicuous, and widely separated grooves, only noticeable under a lens, but minutely punctate; they become somewhat stronger on the base and canal; aperture rather wide and semi-lunate; pillar with three nearly horizontal plaits; the canal very short and wide. Length of shell, 5.5; of last whorl, 4.5; diameter 2.5 mm.

This species is of the type of *M. fulgurita* Reeve, but of markedly different proportions, the nucleus is very distinct from that of the type of *M. barbadensis*, etc. The only specimen seen is clearly immature, but it is not the young of any of the species known to inhabit the coast and is sufficiently characteristic to be easily recognized. The type is No. 109,305, U. S. National Museum.

Mitra dolorosa sp. nov.

Shell smooth, slender, solid, acute; whorls six without the nucleus (which has been lost); the apical whorls show a few (5-7) punctate spiral grooves, which diminish with growth to two or one, and become obsolete on the last whorl; the surface is covered with an olivaceous periostracum; there is in front of the suture a broad ill-defined white band, which does not reach to the periphery; the anterior part of the whorl is dark olivaceous brown; aperture long and wide, canal hardly differentiated, outer lip thin, not lirate; inner lip smooth, with a mere glaze on the body, the pillar solid, with three rather oblique plaits, diminishing forward, the most anterior quite feeble. Length, 20; last whorl, 14; max. diameter, 7 mm.

Dredged on the west side of the Gulf of California in latitude 31° 05′, in 12 fathoms, muddy bottom.

This species has the gloomy color of *Strigatella tristis* but not the shell characters. The type is No. 109,009, U. S. National Museum.

Murex (Ocinebra?) painei sp. nov.

Shell small, rotund, whitish with five or six whorls; nucleus small, smooth, polished; subsequent whorls strongly sculptured; axial sculpture of numerous (on the penultimate whorl 15) sharp longitudinally wrinkled varices extending from the suture to the canal with wider interspaces and somewhat angular or spinose at the shoulder of the whorl; these varices are usually confluent at the suture with those of the preceeding and following whorl; spiral sculpture of strong elevated rounded threads, with a smaller thread in the interspace, somewhat crenulating but not overriding the varices: aperture ovate, the peristome thin, simple, continuous, projecting; there are no lirations in the aperture, the siphonal fasciole is well marked, the canal short and closed over in front of the aperture, with no discarded canal-spines. Length, 15; length of last whorl, 11; max. diameter 8 mm.

This pretty little species resembles one of the Austral Trophons in miniature. It cannot be confounded with any other species of the coast. The type is No. 109,306, U. S. National Museum.

Lunatia draconis sp. nov.

Shell depressed, solid, cream color, sometimes with a ferruginous or livid tinge, with six whorls: nuclear whorls very small, smooth; later ones with an obscure, nearly obsolete spiral sculpture like flattened-out threads, over which run microscopic, close-set, spiral striæ; suture with the whorl in front of it feebly channelled and the excavation bounded by an obsolete thread; top of the whorls flattened, part of the base bordering the umbilicus also flattish, the remainder of the whorl rounded, turgid; umbilicus wide and deep, its walls excavated and closely spirally striated aperture oblique, semi-lunate, outer lip thin, base rounded; the angle where the lip meets the body filled with a smooth white callus, the anterior angle of the pillar lip also thickened. Height of shell, 51.0; of last whorls 49.0; of aperture, 44.0; max. width of shell, 50.0 mm.

This species has no close resemblance to any of the other species of the region. The pillar lip is somewhat thickened with a small purplish-brown callus in the perfect shell. The sculpture and the depressed form seem characteristic. From *L. lewisi* Gould, it is easily separated by its smaller size, depressed form and wide umbilicus pervious almost to the apex of the shell.

Specimens have been obtained from Drake's Bay in 20 fathoms, Monterey in 15 fathoms, off the Farallones Islands in 37 fathoms, and off Avalon, Catalina Island, in about 50 fathoms As Drake was long known to the Spaniards as "El Draco," I have named the species *draconis* in his honor. The type is No. 172,859, U. S. National Museum.

Macromphalina californica sp. nov.

Shell small, elevated, with a wide umbilicus and whitish color; whorls two and a half, the last much the largest, rounded above with a prominent suture, below with a wide funicular umbilicus bordered externally by an obtuse carina; surface sculptured axially with numerous coarse oblique threads separated by narrower interspaces and crossed by fine partially obsolete spiral striation; aperture semi-lunate, entire, very oblique; the pillar lip straight, but the whole peristome simple and thin. Height, 5.5; of aperture, 3.5; max. diameter, 5.5 mm.

The single specimen is not in the best condition, but sufficiently good to show the specific characteristics. The Atlantic species *M. depressa* Seguenza, is much more delicately sculptured and the shell is of a smaller size. *M. californica* is more like *M. duplinensis* Dall, from the miocene of North Carolina, but the latter is less elevated. The type is No. 109,307, U. S. National Museum.

Scala sawinæ sp. nov.

Shell small, elongate, sub-acute, with ten or more whorls; nucleus of three smooth polished whorls; subsequent whorls smooth, with about 19 low, sharp, slightly reflected varices which entirely cross the whorl; at the shoulder these are slightly spinose; aperture rounded ovate, entire, with a small spine at the shoulder angle and a less conspicuous one at the inner base of the aperture; there is no trace of a basal cord or disk, and no spiral sculpture. Length, 10.5; diameter of aperture, 2.5; max. diameter of last whorl 4.0 mm. A broken specimen with three more whorls seems to have measured 24 mm. in total length when perfect, and 8 mm. in diameter.

This species has been found off the Coronado Islands in 34 fathoms and near Avalon in about 50 fathoms. The type is from 16 fathoms off the isthmus harbor on the south side of Catalina Island, where it was dredged by W. H. Dall, in 1873. It is No. 109,309, U. S. National Museum.

Ischnochiton biarcuatus sp. nov.

Animal about 18 mm. long and 7 mm. wide (in the dry state); girdle narrow, with very small, close-set, more or less imbricating, brownish scales; valves rounded evenly above, only the lateral areas distinct; anterior valve with 7 or 8, median with 1, posterior valve with 11 slits; interior of valves rose-pink; exterior ashy, marbled with lilac and brown, an obscure lilac median line on the medial valves; sculpture of undivided central areas formed by two sets of arcuate radiations crossing each other obliquely and with the inter-reticulations impressed or punctate, so that an irregularly zigzag effect is produced by the arrangement of the punctations; lateral areas irregularly concentrically vermiculate, the spaces between the elevated ridges deeply minutely punctate, with somewhat of a zigzag effect here also; the sculpture of the anterior valve resembles that of the lateral areas; of the posterior valve the mucro is low, sub-central and inconspicuous, the central area sculptured like that of the medial valves, the posterior area like the anterior valve; the sutural plates are quite short and the sinus smooth and wide. There is no noticeable mucro to the medial valves.

The peculiar sculpture of this species separates it from those already described from this region. In a general way it recalls the very young of *I. magdalenensis* Hinds. The type is No. 109,308, U. S. National Museum.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF SOME NEW TREE HOPPERS FROM THE UNITED STATES.

BY ELMER D. BALL.

In studying the life histories and food plants of the *Membracidæ* it was discovered that in a number of cases two or more different species of *Telamona* were being confused under one name in collections. In order to remedy this and to bring the genus up to date the following species are described and food plants noted.

Telamona pruinosa, sp. nov. Plate I, figs. 7, 7a, and 7b.

Size and form of *monticola*, nearly, but with a more upright hump and prominent humeral angles. Testaceous powdered with white. Length 10 mm; width 6 mm.

Pronotum rising perpendicularly above the lateral angles in front, upper margin at first convex, then slightly sloping and angled with the posterior margin which inclines a little, forming a large and almost rectangular hump on the anterior half. Humeral angles prominent, acute, half longer than the eyes.

Color.—Pale testaceous washed with pale cream or greenish-white especially on anterior half of pronotum and face. This gives the whole insect a powdered appearance.

Described from five females from Illinois and Iowa. The Iowa specimens collected by the author from a young sycamore tree. The

Smithsonian Institution,
JAN 14 1904
National Museum.

powdered greenish color harmonizes well with the young branches on which they were resting.

Telamona viridia, sp. nov. Plate I, figs. 3, 3a, and 3b.

Resembling *pyramidata* in size and form but with less of a hump. Grass green, the male with some fuscous on posterior half of hump and again at apex of pronotum. Length ♀ 11 mm., ♂ 9 mm; width ♀ 5.3 mm.

Pronotal hump in the shape of an obtuse pyramid one-third the distance back from eye to apex of pronotum, a slight angle on posterior margin just below apex especially marked in the male. Height of hump slightly less than one-third the pronotal length. Humeral angles broad, slightly rounded, a trifle longer than eye.

Color.—Female, grass green slightly mottled with yellow, carina light except at apex of hump and at tip where it is tawny. Male grass green, carina light interrupted with tawny; a fuscous band runs obliquely backward from apex of hump and fades out before reaching the pronotum proper or sometimes connects with a tawny spot on lower margin, whole apex of pronotum tawny.

Described from eleven specimens from Colorado and Iowa, collected by the author, and one from Illinois. This species occurs on the cottonwood (*Populus monilifera*), where its green color and rounded form imitates the larger terminal buds that form in the fall. The larvæ are of a mottled gray and hide in the rough bark.

Telamona obsoleta, sp. nov. Plate, I figs. 2, and 2a.

Resembling *irrorata* but smaller and with a smaller and more rounding hump. Length ♀ 10 mm., ♂ 9 mm.; width 5 mm.

Dorsal hump low and much inflated; it scarcely narrows from the base to just before the apex where it rounds in to form a carina. Anterior margin rising just back of the humeral angles and extending from there half way to the apex of the pronotum. The height is about equal to the whole length and it rounds down to the pronotum proper at both extremities. Front much elevated above the level of the eyes so that the ocelli are farther from the base of front than from each other.

Color.—Yellow with the punctures fuscous, sometimes coalescing into brownish fuscous spots giving the whole insect an irrorate and mottled appearance with little regularity of pattern, Usually there is a semicircle of lighter shade back of the humeral angles and a light spot on middle of hump. There is a pair of large straggling black marks above and within the eyes, some brown on the inner nervures of corium, and a smoky brown cloud at apex.

Described from six specimens collected by the author at Ames, Iowa, and one from Onaga, Kansas (F. F. Crevecoeur). This species occurs on the elm, both larvæ and adults being found in the crevices of the bark of the trunk or large branches, where their mottled gray color renders them very difficult to detect.

Telamona extrema, sp. nov. Plate I, figs. 1, 1a, and 1b.

Form of *unicolor* nearly, smaller and with a still longer hump. Greenish testaceous. Length ♀ 10 mm., ♂ 9 mm.; width 5 mm.

Pronotal hump very high, almost quadrate, occupying the anterior three-fifths of pronotum, anterior margin rising perpendicularly from face, crest highest just back of the well-rounded anterior angle from which it slopes slightly to the almost perpendicular posterior face. Humeral angles moderate, as long as the eyes.

Color.—Greenish testacious; a spot above each eye and the median carina back to the posterior angle of hump fuscous; posterior face of hump broadly marked with creamy white which narrows to a line on the carina posteriorly in the female, and disappears entirely in the male. The lower margin of the humeral angles is sometimes marked with fuscous.

Described from two females collected by the author at Ames, Iowa, and a pair collected in Marion County, Kansas, by F. M. McElfresh. The two Ames specimens were beaten from a patch of second growth oak.

Telamona lugubris, sp. nov.

Form of *reclivata* nearly, slightly shorter and stouter built and with a lower and longer hump and lacking the markings of that species. Obscurely greenish brown. Length ♀ 11 mm, ♂ 9.5 mm ; width 5.5 mm.

Dorsal hump of moderate size, arising just back of lateral angles; anterior margin sloping back, forming a right angle with the inclined crest, posterior margin perpendicular or slightly overhanging. Base of hump occupying a little over two-fifths of distance from humeral angles to apex of pronotum. Humeral angles blunt and obtuse, about two-thirds as long as the eye.

Color.—Pale yellow, the more or less darkened punctures giving the insect a general grayish cast with still darker shadings on the lateral faces of the hump and sometimes on the apex of pronotum.

Described from six specimens from Ames, Iowa, collected by the author, and one from Onaga, Kansas, collected by F. F. Crevecoeur.

The larva of this species was found quite commonly on the trunks of the scrub oak, feeding on the little sprouts and hiding in the crevices of the bark. The adults were found on the small limbs.

Telamona decorata, sp. nov. Plate I, figs. 6, and 6a.

Smaller than *lugubris*, with a shorter and more rounding hump. Yellowish fuscous with the hump deep testaceous brown. Length 9 mm.; width 4.5 mm.

Dorsal hump sloping up from both front and rear, crest rounding, highest just in front of the middle, hump occupying scarcely two-fifths of the pronotum from the humeral angles back. Humeral angles short and blunt, about two-thirds the length of the eye.

Color.—Face and pronotum pale yellow very slightly washed with brown in the female, and with a definite brown shade in the male, median carina alternately light and dark before the hump. Hump rich testaceous with a few light spots on the sides, a definite light mark at the base in front, which may extend up onto the carina, and the whole posterior margin light. This latter light spot extends down on to the pronotum and connects with an irregular transverse light band about half way to apex. Each side of this band is an irregular testaceous band, the anterior one connected with the testaceous hump. A pair of spots above the eyes and the apex of elytra brownish fuscous.

Described from six specimens from Ames, Iowa, collected by the author, one from Onaga, Kansas (Crevecoeur), and a pair from Arkansas (McElfresh). The Iowa specimens were all taken from the smaller branches of the red oak.

Telamona compacta, sp. nov. Plate I, figs. 5, and 5a.

A small, compact, testaceous and white species with a low almost quadrangular hump. Length 8–9 mm.; width 4.3 mm.

Dorsal hump sloping up from above the humeral angles, highest just back of the rounding anterior angles, crest straight or nearly so, sloping posteriorly, the posterior margin very slightly sloping and subangulate with the crest. Hump extending slightly more than half the distance from the humeral angles to the very short and blunt apex. Humeral angles short and blunt, about two-thirds the length of the eye.

Color.—Rich testaceous marked with creamy white, as follows: a number of small spots just above the face, an angular or stellate spot in front of the hump, the posterior margin of hump and a transverse band half way between there and apex of pronotum. Usually a spot or two on lateral face of hump and one on margin below hump. Elytra smoky testaceous with a hyaline band across the base of the apical cells.

Described from a pair from Ames, Iowa, collected by the author, and two females from Arkansas collected by F. M. McElfresh. The pair from Iowa were taken from a patch of mixed oaks.

Telamona ehrhorni, sp. nov. Plate I, figs. 4, and 4a.

Form of *sinuata* nearly but smaller. Dark fuscous brown prettily ornamented with light. Length ♂ 8 mm.; width 4.5 mm.

Dorsal hump long, rather high, rising on a line with the humeral angles, anterior margin straight, inclined backwards, crest roundingly angled in front, sloping posteriorly, slightly emarginate on the posterior half. Posterior margin short, inclined, rounding to the pronotum. Hump occupying nearly three-fifths of the distance from the humeral angle to apex of pronotum.

Color.—Deep brownish fuscous, face and lower margin of pronotum mottled with creamy yellow, a reniform yellow mark with a dark center in front of the hump, a large yellow crescent on each side extending from the middle of the humeral angle nearly half way to the apex and enclosing a few irregular dark spots, an inverted crescentic line extends from a point below the middle of crest. The posterior face of hump is light and this light area connects posteriorly with a transverse light band.

Described from one male taken at Flagstaff, Arizona, by E. M. Ehrhorn, who is doing good work in the scale insects, and who has sent me many fine *Homoptera* from lower California.

Telamona pulchella, sp. nov. Plate I, figs. 9 and 9a.

Resembling *coryli* but much smaller and with a lower, longer hump. Length 5.5-6 mm.; width nearly 4 mm.

Dorsal hump arising in front of the lateral angles but still back of the face and pronotal line, anterior face perpendicular, crest slightly sloping posteriorly, both angles slightly rounding, posterior margin sloping and rounding into a very marked carina on the apical portion of pronotum. Besides this there are three well marked lateral carinæ on the posterior half of the pronotum. Humeral angles long and acute, nearly twice as long as the eye.

Color.—Pale creamy yellow, the lateral angles pale testaceous, the lower margin lined with white which is again margined internally with black. Hump testaceous, omitting the lower half of each margin and an irregular light stripe on the median third. This stripe usually narrows on the middle and then expands into a crescent below. The testaceous on the posterior part of hump extends down to the margin of pronotum and there are a few irregular markings towards the apex.

Described from three specimens collected by the author in southern Colorado. Taken on the scrub oaks of the foot hills.

Telamona brevis, sp. nov. Plate I, figs. 8 and 8a.

Form of *obsoleta* nearly, much smaller and shorter. Smaller and darker than *pulchella*, dark fuscous brown mottled with pale. Length 5 mm.; width nearly 3 mm.

Dorsal crest low, rounding from the anterior margin of pronotum to a point more than half way back from the humeral angles, from here it slopes quickly into the curve of the pronotum. Humeral angles large, stout, half longer than eye.

Color.—Fuscous brown, variable, hump darker, omitting the posterior margin and a crescent on each side. An oblique band runs down from the posterior half of hump to the lower margin of pronotum.

Described from three females collected by the author in southern Colorado. Taken from oak along with the preceding species.

EXPLANATION OF PLATE.

FIG. 1. *Telamona extrema* sp. nov., lateral view. 1*a*. Anterior view; 1*b*. Dorsal view.

FIG. 2. *Telamona obsoleta* sp. nov., lateral view. 2*a*. Anterior view.

FIG. 3. *Telamona viridia* sp. nov., lateral view. 3*a*. Anterior view; 3*b*. Dorsal view.

FIG. 4. *Telamona ehrhorni* sp. nov., lateral view. 4*a*. Anterior view.

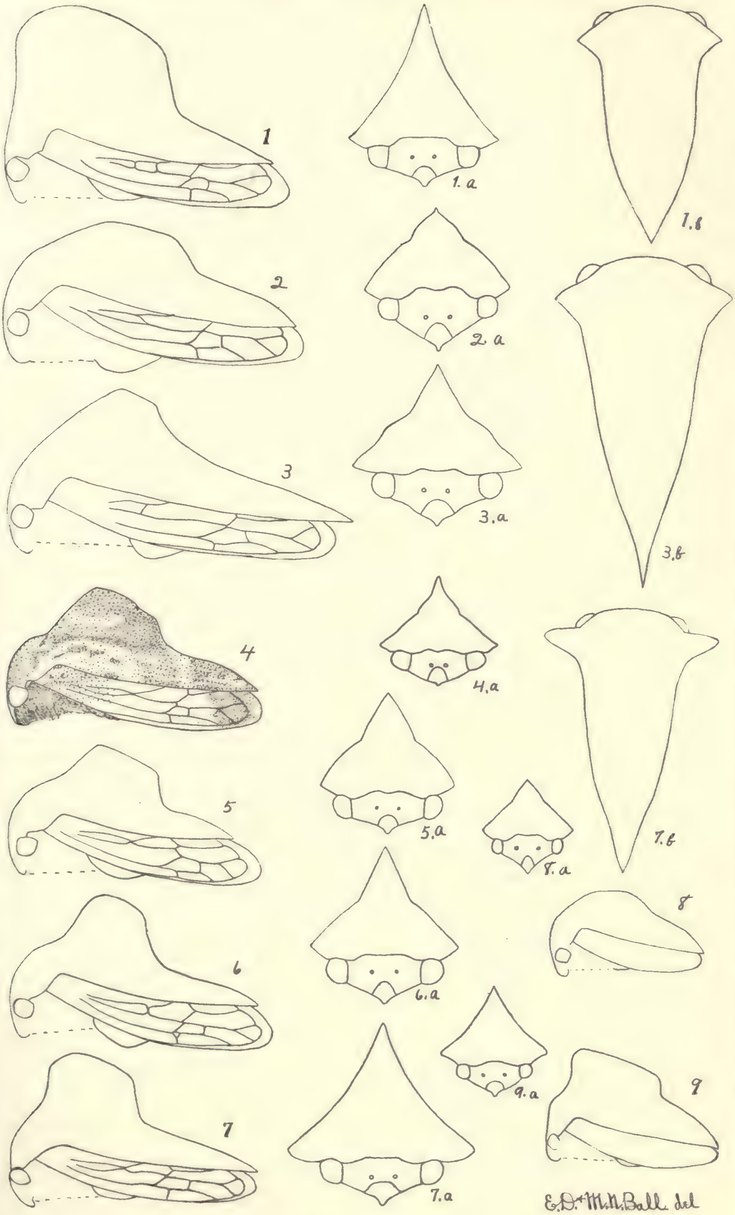
FIG. 5. *Telamona compacta* sp. nov., lateral view. 5*a*. Anterior view.

FIG. 6. *Telamona decorata* sp. nov., lateral view. 6*a*. Anterior view.

FIG. 7. *Telamona pruinosa* sp. nov., lateral view. 7*a*. Anterior view; 7*b*. Dorsal view.

FIG. 8. *Telamona brevis* sp. nov., lateral view. 8*a*. Anterior view.

FIG. 9. *Telamona pulchella* sp. nov., lateral view. 9*a*. Anterior view.


1
1. a
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4. a
5
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8. a
7. b
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E.D. & M.H. Ball del

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PROCEEDINGS

OF THE

Biological Society of Washington

VOLUME XVII

1904

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1905

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ERRATUM.

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OFFICERS AND COUNCIL

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For 1904

(ELECTED DECEMBER 26, 1903)

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VOL. XVII, PP. VII-XII JANUARY 20, 1905

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS.

The Society meets in the Assembly Hall of the Cosmos Club on alternate Saturdays at 8 P. M. Brief notices of the meetings, with abstracts of the papers, are published in *Science*.

January 9, 1904—380th Meeting.

The President in the chair and 57 persons present.

F. A. Lucas noted the occurrence of *Mustela pennanti* as a fossil in Pennsylvania.

B. W. Evermann exhibited a collection of labels used by the canners of the Pacific coast for labeling canned salmon.

The following communications were presented:

F. V. Coville: Desert Plants as a Source of Drinking Water.*

V. K. Chesnut: Death Gulch of the Yellowstone Park.

O. F. Cook: An Exogenous Palm from Guatemala.

January 23, 1904—381st Meeting.

The President in the chair and 36 persons present.

The following communications were presented:

E. W. Nelson: A Winter Trip in Mexico.†

B. W. Evermann and W. C. Kendall: An Interesting Fish from the High Mountains of Central Ecuador.

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* Ann. Rept. Smithsonian Inst. for 1903, pp. 499–505, figs. 1–4, pls. I–II, 1904.

† Nat. Geog. Mag., XV, p. 341, Sept., 1904.

February 6, 1904—382nd Meeting.

The President in the chair and 105 persons present.

The following communications were presented :

Ernest T. Seton : A Study of the Pocket Gophers, the Fertilizers of the West.*

Ernest T. Seton : Scars on the Quaking Aspen.

March 5, 1904—383rd Meeting.

The President in the chair and 85 persons present.

The following communications were presented :

A. K. Fisher : The Birds of Laysan Island.†

J. N. Rose : Revision of the North American Crassulaceae.‡

March 19, 1904—384th Meeting.

The President in the chair and 45 persons present.

C. E. Waters exhibited series of common ferns showing gradations from sterile to fertile fronds.

The following communications were presented :

B. W. Evermann : A Series of Colored Drawings of Hawaiian Fishes.§

W. P. Hay : The Life History and Economic Importance of the Blue Crab.§

Walter H. Evans : An Evident Case of Parthenogenesis in *Begonia.*

O. F. Cook : Natural Selection in Kinetic Evolution.

April 2, 1904—385th Meeting.

The President in the chair and 46 persons present.

F. A. Lucas exhibited lantern slides showing photographs of living animals taken by flashlight.

The following communications were presented :

H. W. Oldys : The Use of Our Musical Scale by Birds.

W. H. Osgood : The Caribou of Alaska.

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* Century Magazine, LXVIII, pp. 300-307, June, 1904.

† See W. K. Fisher, Bull. U. S. Fish Comm. for 1903, pp. 1-39, pls. I-X.

‡ See Britton and Rose, Bull. N. Y. Bot. Garden, III, No. 9, Nov. 11, 1903, and Smithsonian Misc. Coll. (Quart. Issue), XLVII, pt. 2, pp. 159-162, pl. XX, 1904.

§ To be published by U. S. Bureau of Fisheries.

M. W. Lyon, Jr.: Classification of the Hares, Rabbits and Pikas.[*]

M. C. Marsh: The Gas Disease in Fishes.[†]

April 16, 1904—386th Meeting.

The President in the chair and 25 persons present.

Carleton R. Ball exhibited specimens of *Lamium amplexicaule* showing cleistogamous flowers produced in early spring.

The following communications were presented:

W. R. Maxon: Some Jamaican Termite Nests.

Vernon Bailey: A Simple Method of Preserving Tracks.

E. L. Morris: The History and Reproduction of the Bush Morning-Glory.[‡]

E. S. Steele: The Globose Headed Laciniarias.

April 30, 1904—387th Meeting.

The President in the chair and 30 persons present.

The following communications were presented:

C. L. Marlatt: Individual and Specific Characters in Minute Insects as shown under the Microscope.

E. W. Nelson: Notes on the Habits of Two Remarkable Fish from Southern Mexico.

Geo. T. Moore: The Fixation of Atmospheric Nitrogen by Bacteria.[§]

May 14, 1904—388th Meeting.

Vice-President Palmer in the chair and 8 persons present.

No program presented.

October 22, 1904—389th Meeting.

Vice-President Hay in the chair and 23 persons present.

The following communications were presented:

E. A. Schwarz: The Insect Catching Grass of Cuba.[||]

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[*] Smithsonian Misc. Coll. (Quart. Issue), XLV, pp. 321–447, pls. LXXIV–C. June 15, 1904.

[†] To be published by U. S. Bureau of Fisheries; see also Trans. Amer. Fisheries Soc., p. 192, 1904.

[‡] Plant World, VII, pp. 109–113, pls. V–VI, May, 1904.

[§] Bacteria and the Nitrogen Problem, Yearbook U. S. Dept. Agric., pp 333–342, 1903.

[||] To be published in Proc. Entomolog. Soc. Wash., VII, No. 1, Jan., 1905.

J. N. Rose: A Very Curious Plant from Mexico.

Theo. Gill: The Segregation of Freshwater Fishes.

A. B. Baker: Exhibit of Living Animals at the St. Louis Exposition.

November 5, 1904—390th Meeting.

Vice-President Hay in the chair and 46 persons present.

Ch. W. Stiles spoke briefly of the meeting of the International Committee on Zoological Nomenclature in Berne.

The following communication was presented:

Gen. T. E. Wilcox: The Flora of the Western United States and Alaska.

November 19, 1904—391st Meeting.

The President in the chair and 34 persons present.

B. W. Evermann spoke of the abundance of waterfowl at Lake Maxinkuckee, Indiana, about November 5, 1904.

The following communications were presented:

E. L. Greene: A Chapter in the Evolution of Generic Nomenclature.

David White: A New Seed-bearing Fern.*

December 5, 1904—392nd Meeting.

The President in the chair and 35 persons present.

G. K. Gilbert exhibited photographs and specimens of the bark of the aspen tree showing marks made by the claws of bears and other animals.

The following communications were presented:

H. W. Oldys: Some New Bird Songs.

W. H. Dall: The Relations of the Non Marine Mullusk Fauna of Alaska.†

B. W. Evermann: A Trip to Mount Whitney.

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* The Seeds of *Aneimites*, Smithsonian Misc. Coll. (Quart. Issue), XLVII, pp. 322-331, pls. XLVII-XLVIII, 1904.

† To be published in Popular Science Monthly.

December 17, 1904—393rd Meeting.

The President in the chair and 38 persons present.

The following communications were presented:

E. L. Greene: The Earliest Systematic Book of Botany.

A. B. Baker: Animals Recently Received at the National Zoological Park from Abyssinia and South America.

Hugh M. Smith: The Japanese Dwarf Salmon and the Fishing Therefor with Trained Cormorants.*

December 31, 1904—394th Meeting.

The President in the chair and 24 persons present.

The annual reports of the Recording Secretary and the Treasurer were read and accepted. The following officers were elected for the year 1905:

President: Frank H. Knowlton.

Vice-Presidents: E. L. Greene, W. P. Hay, E. W. Nelson, T. S. Palmer.

Recording Secretary: Wilfred H. Osgood.

Corresponding Secretary: Edward L. Morris.

Treasurer: David White.

Councillors: A. K. Fisher, A. D. Hopkins, J. N. Rose, L. Stejneger, H. J. Webber.

The President announced the appointment of the following standing committees for the year 1905:

Committee on Publications: W. P. Hay, David White, W. H. Osgood, E. A. Goldman, C. A. McKnew.

Committee on Communications: Vernon Bailey, A. B. Baker, A. D. Hopkins, J. N. Rose, H. M. Smith.

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* To be published by the U. S. Bureau of Fisheries; see also Trans. Amer. Fisheries Soc., p. 101, 1904.

VOL. XVII, PP. 1-16 FEBRUARY 5, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

SYNOPSIS OF THE GENERA, SUBGENERA AND SECTIONS OF THE FAMILY PYRAMIDELLIDÆ.

BY WILLIAM HEALEY DALL AND PAUL BARTSCH.

The Pyramidellidæ, a family of Mollusks mostly of small size and world-wide distribution, occur fossil first in the Cretaceous, are numerous in the Tertiary, but perhaps are most fully developed in the existing faunas. Very numerous names have been applied to them, sometimes under the impression that the pillar is not plicated in a particular group, a mistake which, by grinding down the whorls, can be corrected; the missing plications being present but falling a little short of reaching a point in the aperture where they are visible externally. In all the forms of which the soft parts are known the external anatomy is very similar. In examining a large series of forms, as noted by Fischer, intermediate types appear until it becomes a matter of great difficulty to decide where, if anywhere, the generic lines can be drawn, and it is not surprising that some authors have fallen back on the expedient of regarding most of the species, notwithstanding the contrasting extremes, as belonging to a single genus. Where a group is composed of such a multitude of species it seems more convenient in practice and leads more efficiently to clear thinking, to take the other view, and subdivide the groups sufficiently to make it reasonably clear where a given species belongs in the series.

In the absence of anatomical characters it has been necessary to fall back in large part on the form, ornamentation, and plications of the pillar, as distinctive characters, even while we admit that between the different sections some intermediate forms may occur. So many names have been applied to members of the group that in most cases it has not been necessary to coin new denominations. The synonymy, which is very involved, is reserved for another paper in which the species of the west coast of America will be monographically treated. It was thought best to put on record the classification adopted, so that before the paper referred to appears the authors may have the benefit of criticism from other students. Many of the specific names given in the past have been repeatedly used for different species, rendering it necessary in many cases to give new ones. In all cases the synonymy adopted has been based on researches which have begun with the typical species of the original authors, which in some of the most anciently named forms has involved no little labor. Wherever any doubt existed in regard to the characters the specimens have been ground down until the pillar has been made visible over a great part of its extent, and in all cases the characters recorded are the result of microscopic study. Only a few of the many named forms have been inaccessible, as the collection of the U. S. National Museum is remarkably rich in species of this group.

The senior author thinks it only just to state that by far the greater part of the work is due to his associate, who has for several years given unwearied attention to these minute and difficult objects of study. The facilities of the National Museum have been constantly at the disposition of the writers, and most of the types are contained in its collection, though thanks for material lent for study are due to the Academy of Natural Sciences of Philadelphia, the authorities of Amherst College, the Zoological Museum of Copenhagen, and numerous private students to whom a fuller acknowledgment will be made in the monograph already alluded to, which is nearing its completion.

The name *Obeliscus* appeared in the Museum Calonnianum in 1797, without a diagnosis or figure. This work is anonymous, and this has been regarded as a sufficient reason for rejecting this and other names contained in it, as it is known that Humphrey, who was an auctioneer and dealer, usually credited with the authorship, is not the author, and the work itself is of no scientific value.

Family **Pyramidellidæ**.

Gastropods with the radula absent or obsolete; the operculum ovoid, paucispiral, with the apex anterior, a thread-like arcuate ridge on the proximal side, the inner margin notched in harmony with the plaits of the pillar when prominent; foot short, moderately pointed behind, with a small operculigerous lobe above and sometimes a small tentacular appendix on each side, in front feebly auriculate or undulate; mantle feebly canaliferous on the right upper margin; a single branchia; verge sub-cylindric, elongate; head with two flattened subtriangular or elongate tentacles, connate, grooved or auriform in the larger forms, the funicles with a ciliated area; below the tentacles an oral orifice from which extends a long retractile subcylindric proboscis, but there is no muzzle like that of *Scala;* below the oral orifice is an organ named by Lovèn the *mentum*, which is usually more or less medially grooved or fissured, and hence, at its anterior end, more or less bilobate, and extensile or retractile before or behind the front margin of the foot. The shell is turrited, with a plicate axis; the outer lip frequently internally lirate; in the larger forms the aperture is obscurely channelled in front; the larval shell is sinistral the adult dextral, the former frequently set at an angle to the adult axis, or more or less immersed in the adult apical whorls; it is usually helicoid and smooth; the sculpture varies from nothing to ribbed, spirally sulcate or reticulate; the coloration when present usually reddish, brownish or yellow. The eggs are numerous and deposited in a lenticular mass. The distribution is worldwide, but the larger forms are mostly tropical.

SYNOPSIS OF THE GENERA OF PYRAMIDELLIDÆ.

Pyramidella Lamarck.

Shell elongate-conic, whorls usually inflated and regularly increasing; the pillar with from one to three folds; the outer lip entire; the shell usually larger than in *Turbonilla.* Type, *Trochus dolabratus* Linné.

Turbonilla Risso.

Shell cylindro-conic, many whorled, generally slender; columellar fold single, varying in strength, outer lip entire; shell usually smaller than in *Pyramidella* and larger than in *Odostomia*. Type, *Turbonilla typica* D. & B.=*Turbonilla plicatula* Risso not *Turbo plicatulus* Scacchi.

Odostomia Fleming.

Shell usually short, few whorled, subconic or ovate; columellar fold single, varying in strength, outer lip entire. Type, *Turbo plicata* Mont.

Murchisonella Mörch.

Shell minute, cylindro-conic; outer lip with an anal sinus behind the periphery of the whorl; pillar with the plait obsolete or internal, whorls numerous and inflated. Type, *Murchisonella spectrum* Mörch.

SYNOPSIS OF THE SUBGENERA OF PYRAMIDELLA.

A^1 Columellar folds three
  Shell umbilicated
    Basal fasciole absent, surface polished, marked by extremely faint lines of growth and microscopic spiral striations
      Subg. **Pyramidella** Lamarck. s. s., 1799.
      Type, *Trochus dolabratus* L.

    Basal fasciole present, surface less polished than in *Pyramidella* s. s., marked by lines of growth and microscopic spiral striations
      Milda subg. nov.
      Type, *Obeliscus ventricosus* Quoy.

  Shell not umbilicated.
    Surface polished, marked only by fine lines of growth and microscopic spiral striations
      Periphery sulcate
        Subg. **Longchæus** Mörch, 1875.
        Type, *Pyramidella punctata* Chem.

      Periphery not sulcate
        Voluspa subg. nov.
        Type, *Pyramidella auricoma* Dall.

    Surface sculptured
      Basal cords absent
        Periphery sulcate
          Shell marked by strong axial ribs which terminate at the periphery, and microscopic spiral striations
            Subg. **Pharcidella** Dall, 1889.
            Type, *Pharcidella folinii* Dall.

Shell marked by strong spiral keels and weak axial riblets
Callolongchæus subg. nov.
Type, *Pyramidella jamaicensis* Dall.

Periphery not sulcate
Shell marked by strong axial ribs, intercostal spaces strongly spirally striated, aperture auricular
Subg. **Otopleura** Fischer, 1885.
Type, *Pyramidella auris-cati* Chem.

Basal cords present
Shell marked by strong spiral ridges, moderately strong axial ribs and two basal cords
Subg. **Triptychus** Mörch, 1875.
Type, *Triptychus niveus* Mörch.

A^2 Columellar folds two
Shell umbilicated
Surface polished, marked by very fine lines of growth and microscopic spiral striations
Subg. **Tiberia** Monterosato, 1875.
Type, *Pyramidella nitidula* A. Ads.

Surface polished, marked by fine lines of growth and strong spiral striations
Ulfa subg. nov.
Type, *Pyramidella* (*Ulfa*) *cossmanni* nom. nov. = *Syrnola striata* Cossmann.

Surface marked by strong axial ribs, intercostal spaces spirally pitted; early post-nuclear whorls sculptured differently from the later ones
Tropæas subg. nov.
Type, *Pyramidella subulata* A. Ads.

Shell not umbilicated
Surface polished, marked by very faint lines of growth and microscopic spiral striations
Basal fasciole present
Vagna subg. nov.
Type, *Pyramidella paumotensis* Tryon.

Basal fasciole absent
Subg. **Eulimella** Forbes, 1846.
Type, *Eulimella crassula* Fbs., =*E. scillæ* Scacchi.

Aperture subquadrate
Sect. **Eulimella** Fbs, ss.
Aperture suboval
Cossmannica sect. nov.
Type, *Pyramidella clandestina* Desh.

A^3 Columellar fold one
Shell umbilicated
Surface polished, or with fine lines of growth and microscopic spiral striations
Peripheral sulcus absent
Subg. **Orinella** nom. nov.
Type, *Orina pinguicula* A. Ads.

Peripheral sulcus present
Sulcorinella subg. nov.
Type, *Pyramidella* (*Sulcorinella*) *dodona*, sp. nov.

Shell not umbilicated
Large, heavy, elongated shells
Surface spirally lirate
Subg. **Actæopyramis** Fischer, 1885.
Type, *Monoptygma striata* Gray.

Slender, medium sized shells
Surface polished, marked by fine lines of growth and microscopic spiral striations
Postnuclear whorls increasing slowly in size at first, then rapidly, lending the shell a mucronate appearance
Subg. **Styloptygma** A. Adams, 1860.
Type, *Monoptygma stylina* A. Ads.

Postnuclear whorls increasing regularly in size
Subg. **Syrnola** A. Adams, 1860.
Type, *Syrnola gracillima* A. Ads.

Aperture suboval
Sect. **Syrnola** A. Adams, s. s.

Aperture subquadrate
Sect. **Stylopsis** A. Adams, 1860.
Type, *Stylopsis typica* A. Ads.
Surface spirally striated
Iphiana subg. nov.
Type, *Syrnola densistriata* Garrett.

Surface axially and spirally striated with a strong spiral keel at the summit of the whorls
Syrnolina subg. nov.
Type, *Syrnola rubra* Pse.

The status of *Agatha virgo* A. Adams 1860, [*Menestho*, 1861, *Myonia*, 1861, *Amathis* 1861], is not known to us. From the meager description we are inclined to believe that it is allied to *Actæopyramis* Fischer.

SYNOPSIS OF THE SUBGENERA OF TURBONILLA.

A¹ Shell without basal keel
  B¹ Varices absent
    Spiral sculpture absent, or if present consisting of microscopic striations only
      Surface of the early post-nuclear whorls marked by feeble axial ribs, later ones smooth
        Subg. **Ptycheulimella** Sacco, 1892.
          Type, *Pyramidella pyramidata* Desh.

      Surface marked by strong axial ribs which terminate at the periphery of the whorls, intercostal spaces excavated between the sutures.
        Subg. **Chemnitzia** Orbigny, 1839.
          Type, *Melania campanellæ* Phil.

      Surface marked by strong axial ribs and intercostal spaces which extend over the periphery to the umbilical region
        Subg. **Turbonilla** Risso, 1826.
          Type, *Turbonilla* { *typica* D. & B.= *plicatula* Risso.

    Spiral sculpture present, always stronger than microscopic striations
      C¹ Axial sculpture consisting of well developed ribs
        Spiral markings consisting of many very fine spiral striations
          Aperture subquadrate
            Subg. **Strioturbonilla** Sacco, 1892.
              Type, *Strioturbonilla alpina* Sacco.

          Aperture suboval
            Subg. **Pyrgolampros** Sacco, 1892.
              Type, *Pyrgolampros mioperplicatulus* Sacco.

        Spiral marking absent between the sutures, base strongly spirally lirate
          Subg. **Sulcoturbonilla** Sacco, 1892.
            Type, *Tornatella turricula* Eichw.

Spiral markings consisting of strong striations
Summits of the whorls strongly shouldered
Subg. **Pyrgisculus** Monterosato, 1884.
Type, *Melania scalaris* Phil.

Summits of the whorls not strongly shouldered
Subg. **Pyrgiscus** Philippi, 1841.
Type, *Melania rufa* Phil.

Spiral markings consisting of one or two strong punctate cords in the intercostal spaces between the sutures; whorls slightly shouldered
Subg. **Pyrgolidium** Monterosato, 1884.
Type, *Pyrgolidium roseum* Mont.

Spiral markings consisting of one or two strong cords; whorls somewhat overhanging
Subg. **Tragula** Monterosato, 1884.
Type, *Odostomia fenestrata* Fbs.

Spiral markings consisting of three to six raised threads between the sutures and lirations on the base; whorls strongly shouldered
Subg. **Dunkeria** Carpenter, 1857.
Type, *Dunkeria paucilirata* Cpr.

C^2 Axial sculpture consisting of faint riblets
Spiral markings consisting of strong raised threads
Subg. **Cingulina** A. Adams, 1860.
Type, *Cingulina circinata* A. Ads.

Spiral sculpture consisting of depressed lirations, sculpture granulose
Subg. **Saccoina** nom. nov.
Type, *Spica monterosatoi* Sacco.

C^3 Axial sculpture consisting of lines of growth only
Spiral markings consisting of many subequally spaced striations; sculpture finely reticulated
Subg. **Careliopsis** Mörch, 1874.
Type, *Monoptygma* (*Careliopsis*) *styliformis* Mörch.

C^4 Axial sculpture absent
Spiral markings consisting of a broad strong fold at the summit of the whorls, separated from the rest of the whorl by a deep, broad, rounded sulcus
Visma subg. nov.
Type, *Eulimella tenuis* Sby.

B² Varices present
Surface marked by axial ribs and strong spiral striations
Subg. **Mormula** A. Adams, 1864.
Type, *Mormula rissoina* A. Ads.

Surface marked by axial ribs and strong spiral lirations, sculpture granulose
Subg. **Lancella** nom. nov.
Type, *Turbonilla* (*Lancea*) *elongata* Pse.

A² Shell with basal keel
Axial sculpture consisting of strong ribs
Spiral sculpture absent
Asmunda subg. nov.
Type. *Chemnitzia turrita* C. B. Ads.

Spiral sculpture present
Spiral sculpture consisting of strong ridges
Subg. **Peristichia** Dall, 1889.
Type, *Peristichia toreta* Dall.

Spiral sculpture consisting of two tumid ridges one at the periphery the other at the summit of the whorls and many fine striations in the intercostal spaces
Baldra subg. nov.
Type. *Turbonilla* (*Baldra*) *archeri* sp. nov.

Axial sculpture consisting of lines of growth only
Spiral sculpture consisting of faint lirations
Discobasis Cossmann, 1888.
Type, *Aciculina demissa* Desh.

SYNOPSIS OF THE SUBGENERA OF ODOSTOMIA.

A¹ Postnuclear whorls sculptured similarly throughout
B¹ Varices absent
C¹ Axial ribs present, rounded
Spiral markings, when present, consisting of mere microscopic striations
Shell inflated
Summit of the whorls slightly shouldered
Subg. **Elodiamea** De Folin, 1884.
Type, *Elodia elegans* De Fol.

Shell not inflated
  Summit of the whorls not shouldered
    Subg. **Odostomiella** Bucquoy, Dautzenberg and Dollfus, 1883.
      Type, *Rissoa doliolum* Phil.

  Summit of the whorls tabulated
    Subg. **Salassia** De Folin, 1885.
      Type, *Salassia carinata* De Fol.

Spiral markings consisting of a strong, broad, raised cord at the summit of the whorls, separated from the remaining part by a strongly impressed spiral groove
      Vilia subg. nov.
      Type, *Odostomia* (*Vilia*) *pilsbryi* sp. nov.

Spiral markings consisting of two tumid ridges, one at the periphery and one at the summit of the whorls; with many striations on the base
      Folinella subg. nov.
      Type, *Amoura anguliferens* De Fol.

Spiral markings consisting of several to many raised threads in the intercostal spaces, always less strongly developed than the axial ribs
  Intercostal spaces crossed by equally spaced, raised spiral threads, sculpture reticulated
    Subg. **Trabecula** Monterosato 1884.
      Type, *Odostomia jeffreysiana* Monter.

  Intercostal spaces crossed by several raised spiral threads, base not spirally marked
    Subg. **Parthenina** Bucquoy, Dautzenberg and Dollfus, 1883.
      Type, *Turbo interstinctus* Montagu.

  Intercostal spaces crossed by several spiral threads, base spirally striated
      Besla subg. nov.
      Type, *Chrysallida convexa* Cpr.

Spiral markings consisting of strong, raised threads or cords, equal to, or even stronger than axial ribs
  Spiral cords equally spaced, and equally well developed between the sutures and on the base; sculpture nodulose throughout
    Subg. **Mumiola** A. Adams, 1864.
      Type, *Monoptygma spirata* A. Ads.

Spiral cords subequally spaced between the sutures, where the sculpture is nodulose; base spirally lirate and axially striated

Subg. **Chrysallida** Carpenter, 1856.
Type, *Chemnitzia communis* C. B. Ads.

Spiral markings consisting of impressed lines

Spiral striations subequally spaced, present between the sutures and on the base of the whorls

Subg. **Pyrgulina** A. Adams, 1864.
Type, *Chrysallida casta* A. Ads.

Spiral striations on the base only, periphery deeply sulcated, axial ribs extending to the umbilical region

Egila subg. nov.
Type, *Chrysallida lacunata* Cpr.

Spiral striations on the base only, axial ribs terminating at the periphery, which is not sulcated

Subg. **Spiralinella** Chaster, 1901.
Type, *Turbo spiralis* Montagu.

C^2 Axial ribs present, lamellar

Spiral markings lamellar

Ribs and spiral lamellæ moderately strong, subequally spaced between the sutures and on the base; sculpture cuspidate

Haldra subg. nov.
Type, *Chrysallida photis* Cpr.

Ribs and spiral lamellæ few, very strong

Ividia subg. nov.
Type, *Parthenia armata* Cpr.

C^3 Axial ribs present but very feeble, usually only indicated near the summit of the whorls

Spiral markings consisting of several strong, broad, tumid cords, one or more of the posterior cords crenulated

Subg. **Miralda** A. Adams, 1864.
Type, *Parthenia diadema* A. Ads.

Spiral markings consisting of many subequally spaced lirations

Whorls tabulated at the summit

Subg. **Ivara** Dall and Bartsch, 1903.
Type, *Odostomia* (*Ivara*) *turricula* D. & B.

Whorls not tabulated
Evalina subg. nov.
Type, *Odostomia* (*Evalina*) *americana* sp. nov.

C^4 Axial ribs usually reduced to mere lirations, frequently only present between the spiral ridges
Spiral markings consisting of moderately well developed cords usually equally spaced and present between the sutures and on the base; axial ribs indicated by faint threads between the spiral sculpture
Shell umbilicated
Subg. **Iolæa** A. Adams, 1867.
Type, *Iole scitula* A. Ads.

Shell not umbilicated
Subg. **Menestho** Möller, 1842.
Type, *Turbo albulus* Fabr.

Spiral markings consisting of strongly raised lamellæ; axial ribs indicated by raised threads
Subg. **Odetta** De Folin, 1870.
Type, *Odostomia* (*Odetta*) *callipyrga* nom. nov. = *Odetta elegans* De Fol.

C^5 Axial ribs absent; axial sculpture represented by lines of growth only
Spiral markings consisting of many, usually subequally and universally distributed impressed lines
Shell elongate-conic
Subg. **Evalea** A. Adams, 1860.
Type, *Evalea elegans* A. Ads.

Shell short, subglobose
Subg. **Oda** Monterosato, 1901.
Type, *Odostomia dolioliformis* Jeffr.

C^6 Axial sculpture absent, shell polished
Spiral markings consisting of two tumid ridges, one at the periphery and the other at the summit of the whorls
Subg. **Cyclodostomia** Sacco, 1892.
Type, *Cyclodostomia mutinensis* Sacco.

Spiral markings consisting of a more or less conspicuous tumid ridge on the summit of the whorls
Subg. **Doliella** Monterosato, 1880.
Type, *Odostomia nitens* Jeffr.

Spiral markings consisting of a strong peripheral keel
Subg. **Scalenostoma** Deshayes, 1863.
Type, *Scalenostoma carinata* Desh.

Spiral markings consisting of a peripheral sulcus
Subg. **Jordaniella** Chaster, 1898.
Type, *Turbo nivosa* Montagu.

Spiral sculpture absent or indicated only by extremely fine microscopic lines of growth or striæ; surface polished
Summits of the whorls with a strongly tabulated shoulder
Subg. **Spiroclimax** Mörch, 1874.
Type, *Spiroclimax scalaris* Mörch.

Summits of the whorls not tabulated
Columellar fold present
Peritreme discontinuous, aperture not rissoid
Shell inflated, very large
Subg. **Amaura** Möller, 1842.
Type, *Amaura candida* Möller.

Shell not inflated
Subg. **Odostomia** Fleming, 1817.
Shell of medium size
Sect. **Odostomia** Fleming, s. s.
Type, *Turbo plicata* Mont.

Shell rather large
Sect. **Stomega** nom. nov.
Type, *Odostomia conspicua* Ald.

Shell small
Sect. **Brachystomia** Monterosato, 1884.
Type, *Odostomia rissoidea* Hanl.

Peritreme continuous, aperture rissoid
Heida subg. nov.
Type, *Syrnola caloosaensis* Dall.

Columellar fold obsolete
Shell umbilicated
Subg. **Myxa** Hedley, 1903.
Type, *Myxa exesa* Hedley.

Shell not umbilicated
Peritreme continuous, aperture rissoid
Subg. **Pseudorissoina** Tate and May, 1900.
Type, *Stilifer tasmanica* Ten-Wood.

Peritreme not continuous, aperture not rissoid
Subg. **Liostomia** G. Sars., 1878.
Type, *Rissoella? eburnea* Stimpson.

B² Varices present

Shell smooth, axial sculpture indicated by a few varices, spiral sculpture wanting
Subg. **Oceanida** De Folin, 1870.
Type, *Oceanida gradata* De Fol.

A² Early postnuclear whorls sculptured differently from the later ones

Early post nuclear whorls loosely coiled, plain; later ones closely coiled with a spiral keel at the periphery and one at the summit of the whorls; base spirally lirate
Lysacme subg. nov.
Type, *Chrysallida clausiliformis* Cpr.

Early post nuclear whorls axially ribbed, succeeded by one or two strongly spirally and faintly axially lirate whorls; the rest of the whorls are marked by a reticulated sculpture consisting of raised axial and spiral cords
Subg. **Obtortio** Hedley, 1899.
Type, *Rissoa pyrrhacme* Melville and Standen, 1899.

DESCRIPTIONS OF NEW SPECIES THAT ARE TYPES OF SUBGENERA DEFINED IN FOREGOING SYNOPSIS.

Pyramidella (**Sulcorinella**) **dodona** sp. nov.

Shell small, elongate-conic, milk-white. Nuclear whorls one and one-half, smooth, obliquely immersed in the first postnuclear whorl. Postnuclear whorls flattened, moderately shouldered at the summit, having a strong spiral sulcus at the periphery. Base of the last whorl well rounded and strongly umbilicated. The summits of the whorls fall a little anterior to the peripheral sulcus of the preceding whorl and cause the part of this, exposed between the sulcus and the summit of the next whorl, to appear as a narrow raised spiral band. Entire surface of the shell crossed by many axial lines of growth and numerous subequally and closely spaced spiral striations. Sutures subchannelled. Aperture ovate, posterior angle obtuse, outer lip thin, columella somewhat curved and reflected having a strong oblique fold a little anterior to its insertion; parietal wall covered by a thin callus.

The type, number 136,023 U. S. National Museum collection, is a fossil, coming from the Oligocene deposit at Oak Grove, Sta. Rosa Co., Florida. It has six and one-half postnuclear whorls which measure: long., 3.1 mm.; diam., 1.4 mm.

Turbonilla (Baldra) archeri sp. nov.

Shell small, elongate-conic, turriculated, milk-white. Nuclear whorls two and one-half, helicoid, about one-fourth immersed in the first postnuclear whorl, having their axis at a right angle to the axis of the later whorls. Postnuclear whorls moderately well rounded, having cuspidated tabulated shoulders and a spiral ridge at the summit and the periphery. Axial ribs prominent, narrow, flexuose, about one-third as wide as the intercostal spaces, sixteen occur upon the first, eighteen upon the fourth and the penultimate whorls. Intercostal spaces decidedly depressed between the spiral ridges, crossed by many subequally spaced microscopic spiral striations. Suture channelled. Periphery of the last whorl angulated, rendered somewhat crenulated by the axial ribs which extend feebly over the base to the umbilical region. A broad, depressed tumid ridge extends across the anterior half of the base, and the space between the posterior termination of this ridge and the peripheral ridge appears somewhat concave. Entire base finely and closely spirally striated. Aperture suboval, posterior angle obtuse, outer lip thin, angulated at the shoulder and periphery; columella straight, slightly reflected; columellar fold obsolete or internal; parietal wall covered by a thin callus.

The type and another specimen are registered as number 58,016 in the collection of the Academy of Natural Sciences, Philadelphia. They were collected by S. Archer, at Singapore. The type has seven postnuclear whorls and measures: long., 3.3 mm.; diam., 1.3 mm.

Odostomia (Vilia) pilsbryi sp. nov.

Shell slender, milk white. Nuclear whorls two and one half, helicoid, a little more than one-third immersed in the first postnuclear whorl, having their axis almost at a right angle to the axis of the later whorls. Postnuclear whorls flattened, or even slightly concave in the middle, between the sutures; contracted near the summit, the posterior portion appearing as a strong, rounded, spiral keel, separated from the rest of the whorl by a spiral groove. Axial ribs prominent, scarcely indicated on the spiral keel but beginning strong at the groove in front of the keel and extending to the umbilical region, gradually diminishing in strength from the periphery to the anterior termination. These ribs are broadest and strongest at this posterior boundary, just anterior to the groove and lend the shell a coronated appearance at this place. About sixteen of them appear on the second and twenty upon the penultimate whorl. Periphery and base well rounded. Sutures well impressed.

Aperture subovate, outer lip [fractured], showing five internal, spiral lirations the middle one of which is stronger than the rest; columella short, twisted and revolute, having a strong oblique fold near its insertion.

The type is number 58,015 of the collection of the Academy of Natural Sciences of Philadelphia and was collected by S. Archer at Singapore. It has six and one half postnuclear whorls and measures: long., 2.7 mm.; diam., 1.1 mm.

Odostomia (Evalina) americana sp. nov.

Shell elongate-conic, subdiaphanous to milk-white. Nuclear whorls quite large, at least two, about three-fourths obliquely immersed. Postnuclear whorls rather broad between the sutures, well rounded, faintly shouldered at the summit, ornamented with depressed, rounded, rather broad axial ribs about eighteen of which occur upon the second, twenty on the third and eighteen upon the penultimate whorl. The ribs are best developed near the summits of the whorls and scarcely extend to the periphery. Spiral lirations low, rounded, subequal, about twelve occur between the sutures upon the third and the penultimate whorls. These spiral lirations like the axial ribs appear strongest near the summits of the whorls. Periphery and base of the last whorl well rounded, the latter ornamented by about eleven lirations which are similar in character to those between the sutures but much less strongly expressed. Aperture rather broad, suboval, somewhat effuse anteriorly, posterior angle acute; outer lip thin; columella short, somewhat curved, strongly revolute anteriorly, having a weak oblique fold near its insertion.

The type, No. 168,718 U. S. National Museum collection, and nine specimens come from San Pedro, California. It has five postnuclear whorls and measures: long., 2.9 mm.; diam., 1.3 mm. Another specimen, 168,719, comes from San Diego, and two others, No. 168,720, from Sta. Catalina Id., California. Ten were determined for Mrs. Oldroyd from San Pedro.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW LIZARD FROM THE RIO GRANDE VALLEY, TEXAS.

BY LEONHARD STEJNEGER.

[By permission of the Secretary of the Smithsonian Institution.]

During the various collecting trips made by the field naturalists of the Biological Survey into western Texas, a series of lizards belonging to the genus *Sceloporus* were collected, which clearly belong to an undescribed species. It forms part of the small section of the genus characterized by the minuteness of the lateral scales, of which, thus far, only two species have been taken within the United States, viz., *S. variabilis* and *S. couchii.* I wish to associate with this very distinct species the name of the originator and chief of the Biological Survey, who has done such an immense work in increasing our knowledge of our vertebrate fauna.

Sceloporus merriami sp. nov.

Diagnosis.—Lateral scales minute, granular; 55 to 56 femoral pores in a continuous series across the preanal region; 56 to 66 scales between the shielded part of the head and the base of the tail; 14 to 18 dorsal scales corresponding to the shielded part of the head; head shields smooth.

Habitat.—Rio Grande Valley, western Texas.

Type.—United States National Museum, No. 33,039; East Painted Cave, near mouth of Pecos River, Texas, September 2, 1890; W. Lloyd, collector, U. S. Biological Survey.

Description.—Type: Adult male. Head-shields smooth; two canthal scales, between the posterior of which three larger prefrontal shields across the snout; frontal shield divided transversely; posterior frontal separated from interparietal and parietals by two pentagonal frontoparietals which are broadly in contact; interparietal larger than the two parietals together, trapezoid, the width anteriorly somewhat less than posteriorly, the length equalling the greatest width; five large transverse supraorbitals separated from the frontals and parietals by a single series of small scales, and from the superciliaries by a double series; six supralabials, separated from the nasal and from the long subocular by a single series of scales, fourth supralabial under the center of the eye; about five elongate pointed scales at anterior border of ear-opening; dorsal scales small, though nearly twice as large as the ventrals, rounded behind, keeled, forming nearly parallel longitudinal lines; 61 scales along the middle line of the back from the shielded part of the head to the base of the tail; 14 scales in the middle of the back corresponding to the shielded part of the head; lateral scales, including a broad area above the foreleg, minute, granular, in strong contrast to the dorsal and ventral scales; ventral scales smaller than dorsals, smooth, often deeply nicked; scales on throat as large as ventrals, those across the lower neck even larger, more pointed and with the terminal portion more free; sides of neck with strong longitudinal folds joining posteriorly an oblique fold in front of the shoulder, which meets the one of the other side across the lower neck; about 114 scales (and lateral granules) round the middle of the body; adpressed fore limb reaches the groin; adpressed hind limb reaches the center of the eye; tibia a trifle shorter than distance from tip of snout to ear-opening; scales covering upper side of limbs larger than the dorsals, especially those on tibia, each with strong keel ending in a point; 51 femoral pores in a nearly continuous line across the preanal region, only one scale interrupting the series on the middle line; tail covered with keeled scales larger than dorsals, sharply mucronate; well-developed postanal plates.

Color (in alcohol) above, very pale clay color with ill-defined obscure dusky spots on the median portion of the back, and numerous, closely set, whitish dots which are most plainly seen above the insertion of the foreleg; a vertical, narrow, bluish-black line, bordered posteriorly with white, in front of the insertion of the foreleg; underside, white; the throat with indistinct, pale bluish-gray lines and a somewhat ill-defined, large, bluish-black, horseshoe-shaped spot on the lower neck; sides of belly pale blue, with a broad crescentic inner edge of bluish-black leaving only about four scale rows on the middle line of the belly white.

Dimensions.—Total length, 130 mm; tip of snout to vent, 55; tip of snout to ear, 13; width of head, 11; fore leg, 28; hind leg, 42.

Variation.—The scutellation is fairly constant in the series of eight specimens examined by me. The head shields show some variation in the size and number of those covering the snout, but otherwise they are surprisingly uniform, especially the three large prefrontals, the frontals, fronto-parietals and interparietals. In one specimen, No. 33,040, the anterior frontal is semi-divided longitudinally, and in a few there is an extra fronto-parietal due to the division of the fronto-parietal or the separation of the anterior portion of the parietal. The fold across the fore neck is very variable, mostly absent or merely indicated. The variation of proportion and size of scales, femoral pores, etc., will be seen from the subjoined table, but it should be remarked that the great diversity in the scales round the middle of the body is probably due to the difficulty in exactly counting the lateral granules.

The males have well-developed postanal scutes which are lacking in the females.

The variation in color is chiefly confined to the degree of distinctness of the dusky markings above. Thus, No. 33,035 has several series of blackish dorsal spots edged behind with smaller whitish spots; leg, (including digits) and tail, are cross-barred with dusky; there is also a well-marked dusky vertical line from eye to edge of lip and a less distinct line between eye and ear. From this specimen there is a complete gradation to the nearly uniform color of the type. There are no indications of longitudinal pale bands on the back, or of any dark band on the sides.

The females lack the blue, black-edged side patch underneath, and also the horseshoe mark on the fore neck; but there are faint bluish marblings on the throat, and the vertical blackish mark in front of the shoulder is indicated.

Habitat.—Thus far only found in the Rio Grande Valley from the mouth of Pecos River to Boquillas. This species, therefore, seems restricted to the Rio Grande Cañon.

Remarks.—This exceedingly distinct species needs no detailed comparison with other species of this difficult genus. By its continuous line of femoral pores across the preanal region it recalls *Sceloporus scalaris*, but the latter has large lateral scales and is also otherwise very different. The species to which this novelty is most nearly related is prob- *Sceloporus couchii*, in which the femoral pores, however, are restricted to the thighs, but the relationship is not near enough to make any further comparison necessary,

It will be noted that the type is described as having a distinct cross-fold under the neck, which is the character attributed by Cope to his genus *Lysoptychus*, based on a single specimen, from southern Texas. This character is absolutely valueless, as it is absent in most of the specimens, and there is nothing else to separate them from the genus *Sceloporus*. As a matter of fact Cope's *Lysoptychus lateralis* is nothing but a specimen of *Sceloporus couchii*, with the types of which I have carefully compared it. I may here correct a mistake in the original description of the latter (Proc. Phila. Acad., 1858, p. 254), in which the number of femoral pores is given as 25. In none of the type specimens (8) is there more than 19 pores on one side. The number varies in the lot between 15-15 and 18-19.

SPECIMENS OF SCELOPORUS MERRIAMI EXAMINED.

U. S. N. M. No.	Sex and age.	Locality.	When collected.	By whom collected.	Snout to vent.	Shield part of head.	Snout to ear-opening.	Tibia	Fourth toe from base of fifth.	Scales, occip. to tail.	Scales in head-length.	Scales round middle.	Femoral pores.
33,033	♂ ad.	Comstock, Texas.	July 26, 1902	M. Cary.	53	11.5	12.5	13	17	66	18	108	28-28
33,034	♀ ad.	Boquillas, Texas.	May 28, 1901	V. Bailey.	45	10	11	12	14	56	15	106	26-
33,035	♂ a l.	Mouth Pecos R., Tex.	Aug. 3, 1902	M. Cary.	52.5	11	12	13	16	61	16	120	25-25
33,036	....	E. Painted Cave, Tex.	Sept. 1890	W. Lloyd.	....	10	10.5	....	....	....	....	....	....
33,037	♂ ad.	" " " "	Sept. 1, 1890	"	55	12	13	13.5	16.5	60	17	107	26-27
33,038	♂ ad.	" " " "	Sept. 3, 1890	"	49	11	11.5	12.5	17.5	60	16	106	26-27
33,039*	♂ ad.	" " " "	Sept. 2, 1890	"	55	12	13	13.5	17	61	14	114	25-26
33,040	♀ ad.	" " " "	Sept. 2, 1890	"	49.5	11	11.5	11.5	16	65	17	115	26-26

*Type.

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PROCEEDINGS

OF THE

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A REVISION OF THE NORTH AMERICAN MAINLAND SPECIES OF MYIARCHUS.

BY E. W. NELSON.

The present paper covers all of the species and subspecies of *Myiarchus* known to occur on the mainland of North America north of the Isthmus of Panama. In addition I have included the birds of Cozumel Island near the coast of Yucatan, and the Tres Marias Islands off the coast of Tepic, western Mexico.

The recently accumulated material in this group, especially the Mexican series in the Biological Survey collection, serves to throw much light upon the characters, relationships and distribution of several obscurely known species. In addition to the large series of specimens available in the Biological Survey and National Museum collections, Mr. William Brewster and Mr. Outram Bangs have kindly sent me material from their collections that has been of great value in filling gaps and enabling me to reach definite conclusions in some otherwise obscure questions.

The genus *Myiarchus* appears to reach its greatest development in the American tropics, including the West Indies, with a limited number of forms ranging well up into temperate North America. These most northerly representatives of the genus are *cinerascens* which reaches the northern border of the Upper Sonoran zone on the west coast in Oregon, and *crinitus* which crosses the Transition zone of eastern America to southern Canada and New Brunswick. *M. lawrencei* and its subspecies is the most widely distributed of the North American species, with a breeding range extending from the Isthmus of Panama to southern Arizona and the Tres Marias Islands. The species of most limited distribution is probably *M. yucatanensis*, found only on the peninsula of Yucatan and on Cozumel Island.

The North American species of *Myiarchus* appear to have but one moult a year and this occurs immediately following the breeding season, from August to September or perhaps October. The birds are much darker or more richly colored for a short period following the assumption of the new plumage than at any other period. This extreme intensity of coloration quickly passes into a duller condition which continues with but little change through the winter months. In spring the colors gradually fade or become bleached by the sun until in the breeding season the original shades of greenish, olive and gray of the back and the yellow of the under parts are almost lost in the dingy browns and yellows of the frayed plumage. The upper parts especially bleach to a dingy grayish brown so nearly alike in several species that there is but little color difference between summer specimens, and identification of birds in this condition depends largely on size and tail pattern. This condition becomes most marked in species living under the brilliant sun of the Lower Sonoran and Arid Tropical regions and is much less noticeable in species like *crinitus* which live in regions of greater humidity and cloudiness.

The general resemblance in color between many of the subspecies and even between some of the species would render a description of faded spring or summer birds misleading in the apparent uniformity of coloration, while the most richly colored condition that is found immediately after the moult in late summer or fall is so evanescent that it can scarcely stand to represent the average characters. For this reason in the following descriptions I have taken, when available, the unworn winter birds which represent the typical colors of the various species from soon after the fall moult until the wear and fading of the spring and summer begin to destroy the distinctive shades of color. I have designated this as the 'fresh' plumage. In some specimens the winter condition of the colors remains until late in spring or early summer, but ordinarily they are much faded at this season. The sexes are alike in color, but the females are usually smaller than the males, as shown by the measurements.

In most of the published descriptions of the rufous-tailed species described in the present paper, little or no range of variation in distribution of the dusky pattern on the tail feathers has been mentioned. This has given the erroneous impression that these markings are rather constant and has led to the identification of female individuals of *cinerascens* from Arizona as *nuttingi*. By the examination of several hundred specimens of the various species it has been demonstrated that the dusky pattern on the inner webs of the outer tail feathers (and to a similar degree on the inner tail feathers) of *cinerascens*, *mexicanus*, *crinitus*, and *nuttingi* with their subspecies have a wide range of variation in extent, though usually preserving a characteristic outline, although at times this also disappears. Thus we have the dusky area practically gone on the inner web of the outer tail feather of some of the females of *cinerascens*, producing a pattern exactly as in *nuttingi*. One specimen of otherwise typical *cinerascens* from Guanajuato has the dusky line along the shaft as in typical *inquietus*, and a specimen of *nuttingi* from Honduras has the dusky shaft line of *inquietus*. *M. crinitus* may or may not have a dusky shaft line on inner web, while in *mexicanus* this line varies greatly in width. The rufous border to inner webs of tail feathers in *yucatanensis* also varies much in width and may or may not be present on the outer feather. The considerable amount of individual variation thus shown renders it difficult to make a key that is serviceable in identifying more than average specimens of some species.

In the cases of *cinerascens* and *nuttingi* the differences in dimensions are decisive and almost equally diagonostic between these two and *inquietus*.

The first plumage of the young in all of the species is characterized by a much greater amount of rufous on the wings and tail than in the adult. This is especially marked on the tail, in which the characteristic dusky pattern of the adult is not apparent. The extension of the rufous on the tail usually includes

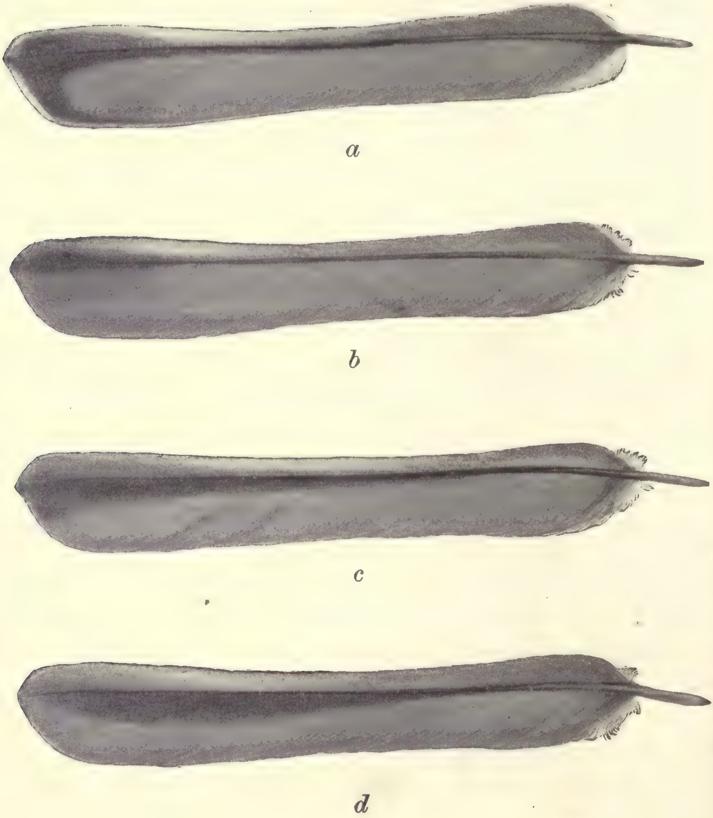

Fig. 1. Outer tail feathers of American Mainland *Myiarchus*.

a. *Myiarchus cinerascens.*
c. *Myiarchus n. inquietus.*
b. *Myiarchus nuttingi.*
d. *Myiarchus mexicanus.*

both middle and outer pair of feathers and effects a generalized pattern.

Even the young of *M. nigriceps* which is without rufous in the adult plumage has it strongly marked on the wings and tail of the young. Among the great number of winter specimens examined I have not found a single individual in this first plumage, so it appears that the young moult this plumage within a short time and assume the dress of the adult.

It is with some hesitation that I add further to the discussion concerning the application of Kaup's *Tyrannula mexicana* and *T. cooperi*, a matter which has already been the subject of much difference of opinion; but the case appears to be still unsettled, and my notes may help toward its definite determination.

In the Proceedings of the Zoological Society of London for 1851, p. 51, Kaup described two species of *Myiarchus* in such a brief and unsatisfactory manner that the application of his names has given rise to much controversy. From recent study of the matter it appears to me that Prof. Baird was right in his disposal of the names (Birds of North America, 1858, p. 180) and that their present use by American ornithologists is wrong. The matter cannot be absolutely settled until Kaup's types are examined, but the present evidence in support of Prof. Baird's conclusions are of interest. He recognized Kaup's error in applying Nuttall's *Musicapa cooperi* (=*Tyrannula cooperi* Kaup, a synonym of *Nuttallornis borealis*), to a *Myiarchus*, and then proceeded to make a new use of the name (loc. cit.), describing in detail as *Myiarchus cooperi* a specimen from "Mexico" (No. 9100 U. S. National Museum). Baird's type is still in the Museum collection and is the bird from eastern Mexico and the Rio Grande Valley commonly known to ornithologists as *Myiarchus mexicanus mexicanus*. In case, as I believe, the latter name belongs elsewhere, then Baird's name *cooperi* becomes available for this species. Baird identified Kaup's *Tyrannula mexicana* as Lawrence's *Tyrannula cinerascens* (Ann. Lyc. Nat. Hist. N. Y., V., Sept. 1851, p. 121) and gave it priority over the latter name on the strength of the dates on which the two papers were read; Kaup's paper having been read on February 11, 1851 and Lawrence's in September, 1851. According to Sclater (P. Z. S., 1893, p. 439) the part of the Proceedings of the Zoological Society containing Kaup's paper was not actually published until October 28, 1852, while the American Journal of Sciences and Arts, 2d Series, XIII, No. 38, p. 303 for March, 1852, contains a notice of Lawrence's paper, thus giving *cinerascens* at least six months priority. The reasons for believing that Kaup's *mexicana* is the same as *cinerascens* are as follows: Kaup states that the type of *T. mexicana* was sent from Mexico by Mr. Wollweber but mentions no definite locality. Mr. Wollweber sent various birds to the Darmstadt Museum in addition to the type of *mexicana*, among which were the types of *Pitangus derbianus* and *Parus wollweberi* both of which were recorded from Zacatecas. I have seen no other locality mentioned for any of Wollweber's specimens and it is not unreasonable to suppose the type of *mexicana* came from the same district. Zacatecas lies on the west side of the Mexican tableland remote from the range of the so-called *M. mexicanus mexicanus* of eastern Mexico, but within the range of *cinerascens* which is common in parts of this State. Furthermore Kaup, in his description of *T. cooperi*, says, "with shorter wings than *mexicanus* but with longer bill like *crinita*, throat and over breast light gray," and mentions the broad black stripe along inner web of outer tail feathers, all of which applies to the bird we now call *mexicanus*. In the description of *mexicana* he says, "breast light ash-gray; above lighter," which is certainly applicable to *cinerascens*. Measurements of a large series of the bird we now call *mexicanus* and of *cinerascens* show that a considerable percentage of males of *cinerascens* have longer wings than many of the specimens of "*mexicanus*" from eastern Mexico, while the differences between the size of bill and color mentioned by Kaup are exactly applicable to these two birds. It is true that Mr. Sclater compared Kaup's type of *mexicana* with certain specimens in the British Museum and found them to be similar and that they were the same as Baird's *M. cooperi* (fide Ridgway, Proc. Biol. Soc. Wash., II, pp. 90–91); but in the Biologia II, p. 91, Salvin and Godman, apparently with the same specimens before them which Sclater found to be similar to Kaup's type and pronounced to be the same as *M. cooperi* Baird, come to exactly the opposite conclusion and pronounce these specimens to represent *cinerascens*, and state that Baird's conclusions as given above regarding the application of Kaup's names were correct.

The authors of the Biologia however, in place of using Baird's name *cooperi* unite the birds of eastern and western Mexico under Ridgway's *magister*, which is a distinct subspecies from *cooperi* and should not be confused with either of Kaup's birds.

The color terms in this paper are based on Mr. Ridgway's 'Nomenclature,' and all measurements are given in millimeters.

I have again to thank Mr. Robert Ridgway and Dr. Chas. W. Richmond, of the National Museum, for their continued courtesies.

KEY TO SPECIES AND SUBSPECIES.

Bill rounded, with depth at angle of gonys nearly or quite equal to width at same place (subgenus *Myiarchus*)
- Wing and tail feathers without rufous or cinnamon area on either web; crown olive brown; back greenish olive - *panamensis* p. 29.
- Wing and tail feathers with distinct rufous or cinnamon area on one or both webs
  - Inner web of outer tail feather usually entirely rufous (except in some specimens a narrow dusky line along shaft mainly near tip)
    - Bill small and proportionately slender (exposed culmen usually less than 19 mm.)
      - Size small, wing usually less than 86 mm. - *nuttingi* p. 37.
      - Size larger, wing usually more than than 93 mm. (♀'s in part) *cinerascens* p. 33.
    - Bill stout and proportionally heavy (exposed culmen usually more than 19 mm.)
      - Underside of neck and breast pale ashy gray *brachyurus* p. 40.
      - Underside of neck and breast dark gray
        - Exposed culmen not over 20 mm. - - *crinitus* p. 29.
        - Exposed culmen over 20 mm. - - *residuus* p. 30.
  - Inner web of outer tail feather partly or wholly dusky
    - Inner web of outer tail feather wholly dusky *yucatanensis* p. 41.
    - Inner web of outer tail feather partly dusky
      - Inner web of outer tail feather with well defined dusky band along shaft, rufous along inner border to tip
        - Bill long and heavy (usually 20 mm. or over); dusky band on inner web of outer tail feather usually broadest in middle.
          - Size smaller, wing usually less than 105 mm. *mexicanus* p. 31.
          - Size larger, wing usually more than 105 mm. *magister* p. 33.
        - Bill small and slender, exposed culmen usually less than 18 mm.; dusky band on inner web of outer tail feather broadening gradually from base, widest at tip

Inner webs of tail feathers mainly rufous *inquietus* p. 38.

Inner web of tail feathers mainly dusky *yucatanensis* p. 41.

Inner web of outer tail feather usually entirely rufous on basal two-thirds, with outer third more or less broadly tipped with dusky

Bill smaller, slenderer; color darker - *cinerascens* p. 33.

Bill larger, broader; color paler - - *pertinax* p. 36.

Bill flattened with depth at angle of gonys decidedly less than width at same place (subgenus *Onychopterus*)

Tail feathers usually distinctly edged on one or both webs with rufous or cinnamon

Tail feathers distinctly edged on both webs with rufous or cinnamon

Crown conspicuously darker than back (black or blackish)

Crown sooty black - - - - *nigricapillus* p. 44.

Crown clove brown - - - - *lawrencei* p. 42.

Crown appreciably darker than back (usually between olive and sepia brown) - - - - *querulus* p. 47.

Tail feathers not at all or but slightly edged on inner webs with rufous or cinnamon

Back greenish or greenish olivaceous

Back greenish, crown intensely black - *bangsi* p. 45.

Back greenish olivaceous, crown bistre brown *platyrhynchus* p. 45.

Back grayish olivaceous or hair brown

Back grayish olivaceous; inner webs of tail feathers usually not edged with rufous - - *olivascens* p. 48.

Back hair brown; inner webs of tail feathers usually slightly edged with rufous - - - *tresmariæ* p. 49.

Tail feathers not edged on either web with rufous; no rufous edgings on wings; crown dull black - - - *nigriceps* p. 49.

DESCRIPTIONS OF SPECIES AND SUBSPECIES.

Genus **Myiarchus** Cabanis.

1845. *Myiarchus* Cabanis, in Tschudi, Fauna Peruana, Aves, 1845, p. 152. Type *Muscicapa ferox* Gmelin.

Typical *Myiarchus* is characterized by a rounded and proportionately deep bill; the depth at angle of the gonys nearly or quite equaling its width at the same place. It includes the majority of the species in this paper, viz., *M. ferox panamensis*, *M. crinitus*, *M. c. residuus*, *M. mexicanus*, *M. m. magister*, *M. cinerascens*, *M. c. pertinax*, *M. nuttingi*, *M. n. inquietus*, *M. brachyurus*, and *M. yucatanensis*.

Myiarchus ferox panamensis (Lawrence).

PANAMA FLYCATCHER.

1860. *Myiarchus panamensis* Lawrence, Ann. Lyc. Nat. Hist. N. Y. VII, p. 284. May, 1860.

Type locality.—Lion Hill, Panama. Type in American Museum of Natural History (Lawrence collection).

Breeding range.—From nearly or quite to the southern border of Costa Rica (specimens examined from David, Chiriqui) through Panama (including San Miguel Island) into northern Columbia at least to Santa Marta. Not migratory.

Zonal distribution.—Humid Tropical.

Subspecific characters.—Larger than *ferox;* upper parts paler, more greenish olive.

Description of fresh plumage.—Crown olive, usually a little darker than back but often the same color; back greenish olive; upper tail coverts vary from hair brown to broccoli brown; tail coverts and outer webs of tail feathers edged with drab or isabella color; outer web of outer tail feather hair brown or drab, distinctly paler than inner web: rest of tail feathers plain dusky, slightly paler at tip; wing coverts, edges of secondaries and tertials hair brown (palest on tertials) and commonly tinged with slight shade of greenish; chin, throat and breast, ash gray; abdomen and under tail coverts sulphur yellow.

Measurements.—Averages of seven adult males from Panama and Chiriqui: Wing, 93.1 (87-96); tail, 90.3 (85-93); culmen, 19.1 (18-20); tarsus, 23.4 (22.5-24.5).

Averages of five adult females from Panama and Chiriqui: Wing, 91 (89-93); tail, 89 (87-91); culmen, 19.4 (18-21); tarsus, 23.7 (23-24.5).

General Notes.—*Myiarchus ferox* was described from Cayenne, Guiana, and the few specimens at hand from that and adjacent sections of South America appear to show that it is smaller with a smaller bill than *panamensis*, and the upper parts browner and less greenish. Birds from Chiriqui average a little larger than those from Panama. The series in the Bangs Collection from San Miguel Island, Panama, are not distinguishable from mainland birds in the same condition of plumage. Like *M. nigriceps* the present species is South American and only enters the area included within the limits of this paper at the northern extremity of its range. It has no near relative in North America.

Myiarchus crinitus (Linnæus).

GREAT CRESTED FLYCATCHER.

1766. *Muscicapa crinita* Linnæus, Syst. Nat., I, 12th ed., p. 325. Based on the *Muscicapa cristata, ventre luteo* of Catesby, Car. I, p. 52, t. 52.

Type locality.—Catesby says "It breeds in Carolina and Virginia" and gives no more definite type locality; but as in the case of most of Catesby's species the Carolina birds probably served for his description.

Breeding range.—Throughout eastern North America from New Brunswick and Manitoba south to northern Florida and to Bexar County, Texas.

Migrates through eastern and southern Mexico and Central America to Panama and the Santa Marta Mountains in Colombia.

Zonal distribution.—Upper and lower Austral and Transition (in breeding season).

Specific characters.—Size large: under side of neck and breast rather dark olive-gray; back distinctly *greenish* olive; inner web of outer tail feather mainly or entirely rufous.

Description of fresh plumage.—Top of head olive with a brownish shade; back greenish olive; upper tail coverts hair brown margined with tawny-ochraceous; wing coverts pale grayish drab, sometimes tinged with greenish yellow; tertials edged with dull grayish white, sometimes tinged with greenish yellow; basal part of outer web of all but outer primary edged with deep cinnamon rufous; outer webs of tail feathers thinly margined on basal half with tawny ochraceous; inner webs of tail feathers, except middle pair, mainly or entirely bright cinnamon-rufous (almost orange-rufous) with a more or less distinct but narrow line of dusky along shaft in the majority of specimens; chin, throat and breast olive gray; abdomen and under tail coverts clear bright yellow—between naples yellow and sulphur yellow of Ridgway.

Description of young in first plumage.—Crown dull olivaceous-sepia brown; back dingy greenish olive; upper tail coverts hair brown broadly bordered and tipped with russet-cinnamon; tail as in adult but with inner webs of middle pair of tail feathers mainly cinnamon-rufous; wing coverts light buffy cinnamon; primaries and secondaries narrowly edged with cinnamon-rufous; tertials bordered with dull yellowish white, slightly tinged with buffy cinnamon; chin, throat and breast french gray; abdomen and under tail coverts primrose yellow.

Myiarchus crinitus residuus Howe.

FLORIDA GREAT CRESTED FLYCATCHER.

1901. *Myiarchus crinitus residuus* Howe, Cont. N. Am. Orn., I, p. 30. May 21, 1902.

Type locality.—Ishtopoga Lake, Florida. Type No. 1233, adult male, Howe-Shattuck Collection.

Breeding range.—Peninsular part of Florida. Probably not migratory.

Zonal distribution.—Lower Austral.

Subspecific characters.—Wing averages a little shorter and bill much larger than in *M. crinitus.*

COMPARATIVE AVERAGE MEASUREMENTS OF MYIARCHUS CRINITUS AND M. CRINITUS RESIDUUS.

Name	Sex	No. of specs	Wing	Tail	Culmen	Tarsus
M. crinitus	♂	10	106.1 (103-112)	92.7 (89-97)	19.3 (18- 20)	21.7 (21-22)
" "	♀	10	98.7 (98-102)	86.9 (83-93)	19.1 (18- 20)	21.4 (21-22)
M. c. residuus	♂	5	102.4 (101-105)	91.8 (90-93	21.3 (20.5-22.5)	21.7 (20-23)

General Notes.—As first pointed out by Mr. Bangs, the Great Crested Flycatchers of southern Florida are readily distinguished from birds occupying other parts of its range by the much greater size of their bills. This character appears so constant and is so marked that it seems to be worthy of recognition by name, although not accompanied by any other equally well marked differences. Unfortunately the birds from the Carolinas are most like those from New England, so that Mr. Bangs in his *Myiarchus crinitus boreus* (Auk, XV, p. 179, April, 1898) renamed the type form. The name afterwards given by Mr. Howe to the bird of southern Florida must therefore be recognized. The amount of variation in color of this species aside from that due to seasonal wear and fading is not great, though occasional specimens have a lighter or more yellowish green shade on the back. The main variation is in the tail markings. Only sixteen out of sixty-six specimens of true *M. crinitus* have the inner web of the outer tail feather entirely rufous. The other fifty specimens have a narrow dusky line along the inner side of the shaft, varying from a thin barely appreciable line to a well marked band covering one-fourth the width of the web. This dusky line on inside of shaft of outer tail feather is present in seven out of eight of the birds from southern Florida. There appears to be no geographic significance in this marking, as it occurs throughout the range of the species and also in both sexes.

Myiarchus mexicanus (Kaup)*

MEXICAN CRESTED FLYCATCHER.

1852. *Tyrannula mexicana* Kaup, Proc. Zool. Soc. London, 1851, p. 51. Published October 28, 1852.

Type locality.—"Mexico." Type sent to the Darmstadt Museum from

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*As explained in the notes under *Myiarchus cinerascens* the name *mexicanus* is probably a synonym of *cinerascens* but is used here in conformity with present custom until the type can be examined.

In case *mexicanus* proves to be a synonym of *cinerascens* then *Myiarchus cooperi* Baird, Birds of N. Am., p. 180, 1858 (Type from "Mexico" Verreaux Collection, No. 9100 U. S. National Museum) becomes available for this species.

Mexico by Mr. Wollweber but no definite locality mentioned.

Breeding range.—From the Rio Grande Valley in southern Texas, south along the tropical and subtropical parts of eastern Mexico to Yucatan, Cozumel Island, Belize, northeastern Guatemala, and Honduras (Ceiba). Migratory only in northern part of its range.

Zonal distribution—Lower Sonoran, Arid and Humid Tropical.

Specific characters.—Crown olive; back brownish olive; wings and tail (on both webs) strongly margined with rufous.

Description of fresh plumage.—Top of head olive with a greenish shade, feathers indistinctly streaked with darker centers; back dull brownish olive, slightly grayer than crown; back of neck slightly grayer than back, forming an indistinct collar; upper tail coverts dingy raw-umber brown, sometimes edged with dull rusty; wing coverts broadly edged with dull brownish white; tertials edged with white, tinged with pale greenish; primaries, except first, edged along middle with dark rufous; chin, throat and breast ashy gray, palest on chin; abdomen and under tail coverts deep primrose yellow sometimes slightly washed with gray (especially in Yucatan and Cozumel specimens); outer web of outer tail feather varying from plain drab to lighter more grayish brown; inner web of outer feather with a band of dusky along shaft from near base to tip, usually a little broader in middle where it occupies from one-fifth to over one-half the width of web; other tail feathers, except middle pair, similar, but dusky band decreasing toward middle of tail.

Measurements.—Averages of seventeen adult males from northeastern Mexico: Wing, 102.4 (98-106); tail, 95.4 (90-98); culmen, 21.3 (20-23); tarsus, 23.5 (22.5-25).

Averages of five adult females from northeastern Mexico: Wing, 95.7 (94-98); tail, 90 (88-91); culmen, 19.9 (19-21.5); tarsus, 22.4 (21-23).

General Notes.—In worn or faded plumage much of the greenish wash on upperparts is lost and the coloration closely resembles that of *magister*. Specimens from the State of Vera Cruz average larger than those from the Rio Grande while those from Yucatan and Cozumel Island are smaller than from any other part of their range. Cozumel birds are also slightly darker than those from elsewhere. This form reaches the borders of the tableland along river valleys but does not inhabit the tableland proper. Its range comes in contact with that of *magister* only through the low gap in the elevated continental area at the Isthmus of Tehuantepec. A large proportion of specimens have the dusky line along shaft on inner web of outer tail feather appreciably broadest in the middle and narrowing toward each end, but in some individuals it is nearly the same width most of its length and in a few cases becomes a little broader near the tip.

A typical specimen in the Bangs Collection taken by Mr. W. W. Brown, January 16, 1902, at Ceiba, Honduras, is the southernmost record of this species with which I am familiar. This was perhaps a winter straggler.

Myiarchus mexicanus magister Ridgway.

ARIZONA CRESTED FLYCATCHER.

1884. *Myiarchus mexicanus magister* Ridgway, Proc. Biol. Soc. Wash., II, p. 90.

Type locality.—Camp Lowell, near Tucson, Arizona. Type No. 86,005, adult male, U. S. National Museum.

Breeding range.—From northwestern Chihuahua and southern Arizona through western Mexico at least to the border of Chiapas. A partial winter migration of northern birds extends as far as Guatemala, but they are resident throughout a large part of their range.

Zonal distribution.—Lower Sonoran and Arid Tropical.

Subspecific characters.—Generally similar to and in some cases difficult to distinguish in coloration from pale or faded specimens of true *mexicanus*, but upper parts averaging grayer and less greenish; throat and breast slightly paler ashy, and abdomen a trifle clearer or brighter yellow; size averages decidely larger.

Description of first plumage.—Crown light seal brown; back dark hair brown; upper tail coverts, broad border to outer webs and most of the inner webs of tail feathers dull, dark cinnamon rufous; lesser wing coverts tipped and tertials edged with pale vinaceous-buff; greater wing coverts, secondaries and primaries broadly edged with dull rusty rufous, paler than on borders of tail feathers; chin, throat and breast pearl gray becoming darkest on breast; abdomen and under tail coverts pale primrose yellow.

Measurements.—Averages of twenty-three adult males: Wing, 108.9 (103-114); tail, 100.3 (93-106); culmen, 23.2 (22-25); tarsus, 25.4 (24.5-26).

Averages of fifteen adult females: Wing, 106.7 (100-110); tail, 98.1 (94-102); culmen, 23 (22-25); tarsus, 25.1 (24-26).

General Notes.—Size is the only character by which *magister* can be distinguished in a great majority of cases. Specimens from the type region in southern Arizona are considerably larger than those from the more southerly part of their range. Among the series from various sections of the range, the one from the Tres Marias Islands averages the smallest thus paralleling the relatively smaller size of the series of typical *mexicanus* from Cozumel Island, off the coast of Yucatan. The types of both "*cooperi*" and *magister*, are larger than average birds of the forms they represent.

Myiarchus cinerascens (Lawrence).

ASH-THROATED FLYCATCHER.

1851. *Tyrannula cinerascens* Lawrence, Ann. Lyc. Nat. Hist. N. Y., V, p. 121. September, 1851.

Type locality.—Western Texas.

Breeding range.—From the Dalles, Oregon, Cheyenne, Wyoming, and central southern Texas south to northern Lower California, central Sonora and at least to Zacatecas on the southern part of the Mexican tableland.

Winter range.—Migrates over all of Lower California and the rest of Mexico (except the southeastern tropical parts) at least to Guatemala.

Zonal distribution.—Upper and lower Sonoran.

Specific characters.—Upper parts grayish brown; crown a little darker than back; inner webs of tail feathers mainly rufous but tipped more or less broadly with dusky on outer feather.

Description of fresh plumage.—Top of head grayish bistre brown, usually a little darker than back; back dark hair brown, becoming paler and grayer in worn plumage; back of neck sometimes paler or more ashy than back; upper tail coverts dark hair brown, sometimes edged slightly with raw umber or russet (never in worn specimens); wing coverts and tertials broadly, and secondaries narrowly edged with grayish white; primaries (except first) edged with rufous; primaries, secondaries, tertials and top of tail feathers clove brown, palest on tertials; underparts from chin over breast and wash over fore-part of abdomen pale cinereous gray, becoming whitish in faded plumage; abdomen and under tail coverts primrose yellow (becoming whitish in faded plumage); basal half or three-fourths of outer web of outer tail feather distinctly whitish, latter color replaced on distal end by dusky line bordering shaft and widening toward end of feather in proportion to extent of same color on inner web of feather; inner web of outer feather cinnamon rufous from base to middle of feather, the rufous replaced along shaft at varying distances beyond this to within one-fifth of length from tip by dusky line gradually broadening to include entire tip and sometimes extending back as narrow border some distance along inner side of feather; extent of dusky tip varies from narrow border to half an inch or more; tips of other tail feathers except middle pair with similar pattern but amount of dusky decreasing inward.

Female.—Dusky on inner web of outer tail feather not rarely restricted to narrow wedge shaped line along shaft on terminal part of feather much as in *M. nuttingi;* but such birds are readily distinguishable by their much greater size.

Young in first plumage (Pecos River, northwest of Comstock, Tex., August 1, 1902).—Top of head dull rusty brown; back dull hair brown; upper tail coverts and tail mainly light cinnamon rufous, including middle pair of feathers; outer web of outer feather paler, except tip; narrow dusky shaft lines on distal third of all tail feathers and broad dusky band along basal two-thirds of shaft except on middle pair; underparts pale ashy whitish to breast; abdomen and under tail coverts yellowish white.

Measurements.—Averages of ten adult males from western Texas: Wing, 101.5 (99-103); tail, 95.2 (93-98); culmen, 18.9 (17.5-20); tarsus, 23.7 (23-24).

Averages of ten adult females from western Texas: Wing, 94.7 (91-98); tail, 87.9 (82-93); culmen, 17.9 (16.5-19); tarsus, 22.7 (21-24).

General Notes.—In "The Auk" for October, 1892, p. 394, was recorded the supposed occurrence in Arizona of *Myiarchus nuttingi* based upon three specimens, all females. in the Biological Survey collection—one from Rillito Creek, near Tucson, one from Oracle, and another from Prescott. After a detailed study of the large series of *Myiarchus cinerascens* and its near relatives in the Biological Survey and National Museum collections, it has become evident that all the supposed specimens of *M. nuttingi* from the United States are really females of *cinerascens.* The error in identification arose from the previously unknown fact that a considerable percentage of the females of *cinerascens* have the dusky area restricted at the tips of the inner webs of the outer tail feathers, sometimes being almost entirely absent and thus producing the exact tail pattern of *nuttingi.*

Myiarchus nuttingi is a much smaller species than *cinerascens* and is represented in the National Museum collection by the type only. There are two specimens in the Biological Survey collection, one from Nenton, Guatemala, and one from Ocozucuautla, Chiapas, the latter probably the most northerly actual record for the species. The broad area lying between the breeding range of *M. cinerascens* and that of *M. nuttingi* is occupied as shown below by *M. nuttingi inquietus* (Salvin and Godman).

I have carefully measured a series of *M. cinerascens* from the type region in western Texas, another from southern Arizona, another from northern California and Oregon, and still another of winter migrants from southern Mexico and northern Guatemala and the averages show close uniformity in size throughout its range, The size, when comparison is made between specimens of the same sex, is so much greater in *cinerascens* that the species may be at once distinguished from *nuttingi* by this character alone.

The identification of specimens of *cinerascens* as *nuttingi* was due to the almost precise similarity of the patterns of color on the outer tail feathers between these specimens and the type of *nuttingi.* On examination of the series of *cinerascens* at hand I find that among 113 males there is not a single specimen that lacks a definite dusky tip to the outer tail feather, although sometimes reduced to a narrow dusky border. On the other hand among 60 specimens of females, 15 of them showed a marked reduction of the dusky at tip of inner web of outer tail feather and a corresponding extension of the rufous. Several of these, in addition to the three specimens cited from Arizona, have the dusky so reduced on this feather that the rufous covers practically all of the inner web to the tip as in *nuttingi.* These were taken on the Santa Cruz River west of the Patagonia Mountains, Arizona, at Owens lake, Inyo County, and Mountain Spring, San Diego County, California, Alpine, mouth of Nueces River and Boquillas, Texas. Others with the dusky much reduced and forming merely a slender wedge-shaped line next the vane on the terminal part of the feather were taken at Baird, California, Santa Cruz River, Arizona, and a winter specimen at Mazatlan, Sinaloa, Mexico. Every gradation is shown in this series between the pattern on the outer tail feather of typical *cinerascens* and *nuttingi* but they are all females, typically *cinerascens* in size and general coloration, and occur sporadically practically throughout the range of the species. From the frequency of this variation of the females it appears that there is a tendency toward the extension of the rufous at the expense of the dusky tip of the outer tail feather among them which is not shared equally by the males. While this variation appears to have no geographical significance, yet it evidently, judging from the specimens examined, occurs most frequently in southern Arizona. All of the 105 males examined have the tip of the outer tail feather sufficiently typical to enable one to identify them by this character without trouble, although there is considerable variation in the extent of the dusky on the tip. In some cases the feather is entirely rufous on the inner web to within one-fifth of its length from the tip, where the dusky begins next the vane and broadens rapidly into a narrow band occupying the tip of the feather and sometimes extending down a little along the inner border. In other cases the dusky begins at varying distances along the shaft to within one-third of its length from the base and extends outward in a gradually widening line to occupy the terminal 5 to 15 millimeters of the feather and may or may not extend back along the inner edge of the feather sometimes nearly or quite halfway to the base. When the dusky extends back along the inner edge of the feather the outer end of the rufous on this vane forms a narrowing point on the middle of the web. In other specimens it is cut squarely off by the inward extension of the dusky near the end of the feather. This variation occurs throughout the range of the species.

Myiarchus nuttingi inquietus (Salvin and Godman) replaces *M. cinerascens* to the south in Mexico, and the material at hand appears to show that they are distinct species.

Myiarchus cinerascens pertinax (Baird).

CAPE ST. LUCAS FLYCATCHER.

1859. *Myiarchus pertinax* Baird, Proc. Acad. Nat. Sci. Phila., 1859, p. 303.

Type locality.—Cape St. Lucas, Lower California. Type No. 12,944, U. S. National Museum.

Breeding range.—Cape region of Lower Calfornia north at least to Pichilinque Bay. Not migratory.

Zonal distribution.—Arid Tropical and border of Lower Sonoran.

Subspecific characters.—Similar to *cinerascens* but grayer above and more whitish below; size smaller; bill larger.

Description of first plumage.—Crown warm sepia brown; back hair brown; upper tail coverts dull cinnamon rufous; middle pair of tail feathers strongly margined with same; outer webs of rest of tail feathers except outer one similarly margined; outer web of outer feather whitish on basal half and becoming drab on distal third; inner webs of all but middle pair plain cinnamon rufous except for a slender dusky line along shafts near tips; wing coverts tipped with whitish and narrowly edged with dull cinnamon; tertials edged with whitish; secondaries broadly edged with cinnamon shading into broad edgings of light cinnamon rufous on primaries; chin, throat and breast pale pearl gray; abdomen and under tail coverts white with the faintest tinge of yellowish.

Measurements.—Averages of three adult males; wing, 94,6; tail, 89.3; culmen, 19.6; tarsus, 23.3.

General Notes.—There is some difficulty in distinguishing specimens of *pertinax* from faded ones of *cinerascens*, but the larger bill of *pertinax* and its smaller size are usually sufficiently marked to distinguish them. In fairly fresh plumage *pertinax* is distinctly grayer on the upper parts. The exact limits between the ranges of the two forms is still undetermined.

Myiarchus nuttingi Ridgway.

NUTTING'S FLYCATCHER.

1882. *Myiarchus nuttingi* Ridgway, Proc. U. S. National Museum, V, p. 394.

Type locality.—La Palma, Costa Rica. Type No. 87,391, U. S. National Museum.

Breeding range.—Costa Rica (La Palma): Honduras (on Nicaraguan boundary 180 miles from Pacific Coast); Guatemala (Nenton); Mexico (Ocozucuautla, Chiapas). Not migratory.

Zonal distribution.—Arid and Semi-Arid Tropical.

Specific characters.—Size small, wing not over 88 mm.; back rather light olivaceous brown; inner web of outer tail feather usually almost wholly rufous.

Description of fresh plumage.—Crown olive brown with slightly darker shaft lines, and borders of feathers with a shade of bistre brown; back varying from slightly grayish to yellowish olive, usually with less greenish than in *brachyurus;* upper tail coverts dark broccoli brown shaded and slightly edged with dark raw umber; wing coverts and tertials broadly edged with dingy brownish white, palest on tertials; primaries edged with dark rusty; outer web of outer tail feather light drab; inner web usually plain rufous except a fine line of dusky along shaft near tip, but sometimes with dusky line along shaft much as in *inquietus;*chin, neck and breast dull gray, palest on throat; abdomen and under tail coverts between primrose and sulphur yellow. Upperparts of worn specimens, like the type, are dull grayish, olive brown.

Measurements.—Averages of two adult males: Wing, 86.5 (85-88); tail, 84 (81-87); culmen, 17.2 (17-17.5); tarsus, 22 (21-23).

Adult female (one specimen): Wing,,85; tail, 84; culmen, 17; tarsus, 22.

General notes.—This species has a close general resemblance to *brachyurus* and apparently occupies about the same range, for both have been taken along the Pacific coast region from Costa Rica to Chiapas, Mexico. Its smaller size, less greenish upperparts and slightly darker underparts are the main characters. The small bill of *nuttingi* at once distinguishes it among the specimens of *brachyurus* at hand. In the original description of *nuttingi* the specimens cited as belonging to that species, with the exception of the type, all proved to belong to another species which Mr. Ridgway afterwards described as *brachyurus*, thus leaving the type the unique representative of *nuttingi* in the National Museum collection until two others were secured by Mr. Goldman and myself in Chiapas and Guatemala. Through the lack of definite knowledge of just what *nuttingi* represented, quite a number of erroneous citations of this species have been made, and its range unwarrantably extended far beyond its real limits. Attention is called to this in the notes upon *M. cinerascens.*

A specimen in the Bangs collection, taken on the boundary line between Nicaragua and Honduras, 180 miles from the Pacific coast, differs from typical birds in having a well marked dusky line along the shaft on the inner web of outer tail feather, and less conspicuously the same on other tail feathers, as in typical *inquietus.* The size and color, however, show that this is *nuttingi,* and these tail markings merely due to individual variation.

Myiarchus nuttingi inquietus (Salvin and Godman).

GODMAN'S FLYCATCHER.

1889. *Myiarchus inquietus* Salvin and Godman, Biol. Cent.-Am., II, p. 88. March, 1889.

Type locality.—Acahuizotla*, Guerrero, Mexico. Type in British Museum.

Breeding range.—Arid tropical and subtropical parts of southwestern Mexico from central western Chihuahua and southern Sonora to Isthmus of Tehuantepec and inland to southern Puebla. No definite migration, but strays in winter to Guatemala.

Specimens examined from: Sonora (Nacosari, Alamos); Chihuahua (Batopilas, Hacienda San Rafael, El Carmen, Durasno); Sinaloa (Culiacan); Durango, (Chacala); Tepic (Acaponeta); Zacatecas (San Juan Capistrano); Jalisco (La Barca); Michoacan (La Salada, Zamora); Morelos. (Yecapixtla); Puebla (Tehuacan); Guerrero (Acahuizotla, Dos Arroyos, El Rincon, Acapulo, Papayo, El Naranjo, La Lagunilla, Rio Balsas); Oaxaca (Huilotepec, Tehuantepec City, Santa Efigenia, Chihuitan); Chiapas (Gineta Mountains); Guatemala (Nenton).

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*This is a small plantation on the road between Acapulco and Chilpancingo. The spelling of the name Acaguisotla given in the original description is erroneous for the owners of the place spell it as given above.

Zonal distribution.—Lower Sonoran and Arid Tropical.

Description of fresh plumage.—Crown grayish bistre brown, a little darker than back: back grayish olive brown, becoming much like *cinerascens* in faded plumage; upper tail coverts light sepia brown, strongly edged and often distinctly colored throughout with tawny olive or rusty olive; primaries, secondaries, tertials and top of tail dark hair brown; wing coverts and tertials edged with dull brownish white, bleaching to dull whitish; primaries (except first) narrowly edged along middle with rusty rufous; chin, neck and breast pale cinereous ashy, little if any darker than in winter specimens of *cinerascens;* abdomen and under tail coverts sulphur yellow; outer web of outer tail feather in some specimens uniform pale hair brown and in others edged more or less with whitish; inner web of this feather cinnamon rufous with a line of dark hair brown (varying somewhat in shade) along shaft beginning on basal third of feather and gradually widening to occupy from one-fourth to entire width of inner web at tip; same pattern repeated with decreasing amount of dusky inward on other feathers except middle pair.

Description of first plumage (♀ Rio Balsas, Guerrero, Mexico, June 3, 1903).—Much like same plumage of *M. cinerascens* but darker; top of head sepia brown with a light wash of dull tawny; back dull, dark hair brown; wing coverts and tertials edged with lighter, varying from pinkish buff to ochraceous buff; upper tail coverts dark cinnamon rufous with dusky shaft streaks; tail cinnamon rufous with bases of middle pair of feathers dusky and a narrow shaft line of same extends thence toward end of feathers gradually broadening to occupy most of feather near tip, but completely bordered by rufous; outer web of outer feather dusky, edged broadly along middle two-thirds with pale buffy whitish; outer web of other tail feathers with broad dusky band along shaft and narrower edging of rufous; inner webs of all except middle pair plain rufous. Underparts from chin over breast pale cinereous ashy; abdomen and under tail coverts pale yellowish white.

Measurements.—Average of ten adult males*: Wing, 91.2 (88-93); tail, 88.4 (85-92); culmen, 18 (17.5-21); tarsus, 22.4 (22-23).

Averages of five adult females*: Wing, 86.8 (85-88); tail, 84.8 (81-87); culmen, 17.2 (17-18): tarsus, 21.5 (21-22).

General notes.—Up to the present time, except for the brief notes published with the original description, this bird has remained comparatively unknown. During the spring of 1903, Mr. Goldman and I secured specimens at the type locality and elsewhere throughout this region, which added to specimens already in the Biological Survey and National Museum form an excellent series covering a wide range in western and southern Mexico. Instead of being, as the describers suggested, "a small resident form of the migratory *M. crinitus* of eastern America, which being isolated in the Sierra Madre del Sur, has acquired distinctive characters," it is a common resident of western Mexico from Batopilas in western Chihuahua to the Isthmus of Tehuantepec. The specimens from the Isthmus and adjacent part of Chiapas are distinctly intergrades showing that *inquietus* is merely a northern subspecies of *Myiarchus nuttingi*, which latter does not appear to range north of Chiapas.

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*Specimens from southwestern Mexico, mainly from the region about the type locality.

Nine specimens, representing both sexes, from the Pacific Coast of the Isthmus of Tehuantepec and thence to the border of Chiapas, have the brown line along the inside of the shaft of the outer tail feather considerably reduced, often to half or less the amount found in typical birds. They are also rather smaller than typical birds and their color is otherwise like that of *nuttingi*, This combination of exactly intermediate characters in the birds of this section with the occurence of undoubted *nuttingi* a little farther down in Chiapas and Guatemala appears sufficiently conclusive evidence to warrant placing *inquietus* as a subspecies of *nuttingi*. In general coloration these two forms appear to be practically identical so that they are to be separated only by size and pattern of color on the outer tail feathers.

M. n. inquietus is intermediate in size between *nuttingi* and *cinerascens* and there is a close resemblance in the color of the upper parts of slightly faded specimens of *inquietus* and *cinerascens*. In freshly assumed fall plumage the upper parts of both these species are darker than at any other time. At such times *inquietus* may be distinguished by its darker and browner upper parts and the richer yellow of the abdomen as well as by the tail pattern.

A careful examination of the large series of *inquietus* and *cinerascens* now available has failed to reveal any evidence of intergradation. Birds from the river valleys of western Chihuahua and Sonora differ from *cinerascens* in size and color almost equally with those from Guerrero. The breeding range of *M. inquietus* appears to be complementary to that of *cinerascens*, but during the winter *cinerascens* migrates over the range of *inquietus*.

These two birds have evidently been confused by different authors under the name of *cinerascens* so that without the specimens for verification it will be impossible to satifactorily place some of the winter citations for western and southern Mexico. Summer records within the demonstrated range of either can be more readily handled.

Myiarchus brachyurus Ridgway.

SHORT-TAILED FLYCATCHER.

1887. *Myiarchus brachyurus* Ridgway, Man. N. Am. Birds, p. 334.

Type locality.—Ometepe, Nicaragua. Type No. 91,057, U. S. National Museum.

Breeding range.—Costa Rica (San Lucas, Bahia de Salinas); Nicaragua (Ometepe, San Juan del Sur); Mexico (Tonala, Chiapas). Not migratory.

Zonal distribution.—Arid and Semi-Arid Tropical.

Specific characters.—Generally similar to *M. nuttingi* but larger and heavier with much stouter, heavier bill and proportionately shorter tail.

Description of fresh plumage.—Crown dark olive shaded with greenish and a slight buffy suffusion on borders of feathers in some specimens; back lighter olive with a greenish shade (latter nearly or quite absent in worn plumage); back of neck sometimes a little grayer than back; upper tail coverts dark broccoli brown edged and sometimes suffused throughout with dark rusty rufous; primaries, except first one, edged along middle with dark rufous; wing coverts and tertials edged with dull whitish or brownish white with shade of greenish on coverts in some specimens; outer web of outer tail feather pale drab; inner web uniform rufous, sometimes with a narrow inconspicuous line of dusky along shaft; other tail feathers, except middle pair, similar; chin, neck and breast ashy gray palest on chin; abdomen and under tail coverts deep primrose yellow.

Measurements.—Averages of two adult males: wing, 96 (93-99); tail, 86 (85-87); culmen, 21 (21); tarsus, 23.5 (23-24).

Averages of five adult females: wing, 94.4 (93-96); tail, 85.2 (81-87); culmen, 20.7 (19.5-21); tarsus, 22.6 (22-23).

General notes.—In general coloration this species differs but slightly from *M. nuttingi* but may be easily distinguished by differences in size and proportion, and especially by the much larger bill, and more rusty upper tail coverts, Although resembling *crinitus* somewhat in size and pattern of color on outer tail feathers yet the much paler colors above and below readily distinguish them from that species. Like other members of the genus this species gradually fades in spring until the upper parts lose the greenish cast and become dull olive brown.

Myiarchus yucatanensis Lawrence.

YUCATAN CRESTED FLYCATCHER.

1871. *Myiarchus yucatanensis* Lawrence, Proc. Acad. Nat. Sci. Phila., 1871, p. 235. Based on the *Myiarchus mexicanus* Lawrence (nec Kaup) Ann. Lyc. Nat. Hist. N. Y., IX, p. 202, June, 1869.

Type locality.—Merida, Yucatan. Type in American Museum of Natural History (Lawrence Collection).

Breeding range.—Peninsula of Yucatan and Cozumel Island. Not migratory.

Zonal distribution.—Arid or Semi-Arid Tropical.

Specific characters.—Crown bistre brown; upper tail coverts hair brown, slightly if at all edged with russet; inner webs of all but middle and often outer pair of tail feathers broadly edged with well defined band of cinnamon buff.

Description of fresh plumage.—Crown bistre brown with or without a slight olivaceous shade; back olive; upper tail coverts hair brown with or without slight edging of russet; tail feathers edged externally on basal half with drab, sometimes thinly bordered with dull rusty; primaries (except outer pair) and part of secondaries distinctly edged with rusty rufous; wing coverts broadly tipped with drab or broccoli brown; tertials broadly edged with grayish white; chin, throat and breast rather dark ash gray; abdomen and under tail coverts straw yellow; outer web of outer tail feather drab, varying in shade but usually much lighter than inner web and sometimes edged with whitish; inner webs of all but outer and middle pair of tail feathers with a well defined border of cinnamon buffy covering from one-third to one-half the web; inner web of outer tail feather sometimes plain dusky but more often slightly and sometimes distinctly bordered with cinnamon buffy.

Measurements.—Averages of four adult males: Wing, 84.7 (83-87); tail, 84 (81-85); culmen, 17.5 (17-18); tarsus, 21.8 (21-22.5).

Averages of two adult females: Wing, 78.5 (78-79); tail, 79 (78-80); culmen, 17; tarsus, 21.7 (21.5-21.7).

General notes.—As already noted by Mr. Sclater (Cat. Bds. Brit. Mus. XIV, p. 260), the present species appears to be most nearly related to the *Myiarchus stolidus* group of the West Indies. On the mainland it has no close relative nearer than northern South America.

The proportions of wing and tail vary considerably, and in the series of seventeen specimens examined (mostly not sexed) nine had the tail equalling or longer than the wing and eight had the tail shorter than the wing.

Subgenus **Onychopterus** Reichenbach.

1850. *Onychopterus* Reichenbach, Av. Syst. Nat., t. lxv. Type *Tyrannus tuberculifer* D'Orbigny and Lafresnaye.

This group is characterized by a flattened and proportionately broad bill; the depth at the angle of the gonys being decidedly less than its width at same place. The species in the present paper belonging to this subgenus are *M. lawrencei* with its subspecies and *M. nigriceps.*

Myiarchus lawrencei (Giraud).

LAWRENCE'S FLYCATCHER.

1841. *Muscicapa lawrencei* Giraud, Sixteen Birds of Texas, t. 2, f. 1.

Type locality.—"Texas." The type, No. 47,690 U. S. National Museum, agrees in size and other characters with birds of northeastern Mexico, whence it probably came.

Breeding range.—From near Monterey, Nuevo Leon, in northeastern

Mexico, south in foothill country to the state of Vera Cruz and eastern San Luis Potosi, and thence generally distributed in tropical and subtropical parts of eastern Mexico to the Isthmus of Tehuantepec. At the Isthmus they spread across to the Pacific coast and occupy suitable areas on both coasts in southern Oaxaca, Tabasco, Chiapas, and at least part of Guatemala. They do not occur in the coast belt of northern Tabasco and Campeche, nor the Peninsula of Yucatan, where they are replaced by *M. l. platyrhynchus.* Not migratory.

Zonal distribution.—Arid Tropical in northern, Humid Tropical in southern part of range.

Specific characters.—Crown decidedly darker than back—usually clove brown; back brownish olive; tail feathers strongly edged externally with rufous and inner border of inner webs usually distinctly edged with vinaceous-buffy or cinnamon-buffy.

Description of fresh plumage.—Crown clove brown, sometimes more or less washed with olive, but always much darker than back; back olive, always with a brownish shade, but often with a slight greenish tinge; upper tail coverts broccoli brown edged and often suffused with russet or cinnamon-rufous; secondaries and all but first primary and outer borders of tail feathers strongly edged with dark rusty rufous; wing coverts usually with broad edging of cinnamon or russet varying to isabella color; chin, throat and breast ash gray; abdomen and under tail coverts rich sulphur yellow; inner webs of tail feathers usually with a distinct and often broad border of reddish-buffy, broadest on inner rectrices and often present on middle pair; occasionally this buffy border nearly or quite absent, especially in specimens from southern part of range.

Description of young in first plumage.—Crown seal brown; back dark sepia brown; upper tail coverts dark hair brown broadly edged with russet; tail feathers broadly bordered on both sides by light cinnamon-rufous; wing coverts, tertials, primaries and secondaries strongly edged with rusty vinaceous-cinnamon not very different from color on border of tail feathers; chin and throat light gray shading into olive gray on sides of neck and breast; abdomen and under tail coverts primrose yellow, deepest on middle of abdomen.

Measurements of typical specimens from Tamaulipas and Nuevo Leon.—Averages of six adult males: Wing, 87.7 (82-90); tail, 84.7 (77-89); culmen, 17.1 (16.5-18); tarsus, 21 (20-22).

Averages of five adult females: Wing, 83.8 (80-88); tail, 80.2 (76-84); culmen, 16.8 (16-18); tarsus, 20.2 (20-21).

General notes.—Typical *Myiarchus lawrencei*, characterized by its large size and the amount of rufous edgings on both webs of tail feathers, is found only in northeastern Mexico from Monterey, Nuevo Leon, to northern Vera Cruz. South of this there is a steady decrease in size to the Isthmus of Tehuantepec. This decrease in size is accompanied by a decrease in the amount of rufous bordering the inner webs of the tail feathers. Birds from south of the Isthmus to Guatemala are decidedly smaller than those from the northern part of the range, and agree closely in this character with *nigricapillus* from Costa Rica, but the colors of upperparts are most like those of typical *lawrencei*, with which I have placed them. The birds from southern Vera Cruz to Guatemala occupy a belt between the ranges of *querulus* on one hand and *platyrhynchus* on the other, and the occurrence of intergrades with these forms and with *nigricapillus* to the south renders the exact determination of many specimens from this region extremely difficult. In cases of this kind one is forced to name specimens arbitrarily or leave them undetermined. The amount of rufous margination to inner webs of tail feathers sometimes covers half the web in specimens from northeastern Mexico, and in southern Vera Cruz and southward individuals occur in which there is little or no trace of it, though they are not numerous. Some specimens from Jalapa and other localities farther south in Vera Cruz have the buffy border on inner webs of tail feathers much restricted and sometimes indistinct. The backs in winter specimens throughout its range in northeastern Mexico vary from dull olivaceous to olivaceous brown. Resident birds from Santa Efigenia, Oaxaca, and from other points on the Pacific slope south of Tehuantepec in Chiapas are more like typical *lawrencei* in size and color than those from the southern part of its range on the Gulf coast.

Myiarchus lawrencei nigricapillus (Cabanis).

COSTA RICAN FLYCATCHER.

1861. *Myiarchus nigricapillus* Cabanis, Journal für Ornithologie, 1861, p. 250 (in text).

Type locality.—Costa Rica. No type nor specific locality mentioned.

Breeding range.—Central America from southern Guatemala to Costa Rica. Not migratory.

Zonal distribution.—Humid Tropical.

Subspecific characters.—Crown blacker than in true *lawrencei;* back darker olive; size smaller.

Description of fresh plumage.—Crown brownish black, sometimes tinged with olive; back dark olive, slightly less grayish than in true *lawrencei;* upper tail coverts dark broccoli brown edged with dark russet or rusty rufous; wing (except first primaries) and tail feathers edged externally with dark russet or rusty rufous; wing coverts bordered with cinnamon or russet; chin, throat and breast dull ash gray, averaging darker than in *lawrencei;* abdomen and under tail coverts rich sulphur yellow; inner border of tail feathers usually with narrow edging of cinnamon buffy, this border occasionally covering one-fourth of web.

Measurements of specimens from Costa Rica and Nicaragua: Averages of four adult males: Wing, 82 (80-83); tail, 77.2 (75-79); culmen, 16.1 (16-16.5); tarsus, 20.2 (20-20.5).

Averages of four adult females: Wing, 76.5 (75-78); tail, 69.5 (66-72); culmen, 16 (16); tarsus, 19.6 (19-20).

General notes.—Birds from Honduras, Nicaragua and Costa Rica, of which I have examined a considerable number, agree closely in size and color. The Hondurus birds, however, average a little smaller than those from Costa Rica. There is the usual variation in amount of rufous edgings to outer borders of wings and tail.

Myiarchus lawrencei bangsi subsp. nov.

BANGS'S FLYCATCHER.

Type.—No. 8758, adult male, Collection of E. A. and O. Bangs. From Boquete, Panama. Collected January 26, 1901, by W. W. Brown, Jr.

Breeding range.—Panama. Not migratory.

Zonal distribution.—Humid Tropical.

Subspecific characters.—Crown intensely black; back greenish; inner webs of tail feathers without buffy borders.

Description of fresh plumage.—Crown intensely black; back dark greenish olive; upper tail coverts dark hair brown slightly edged with dull russet; tail bordered externally with dull russet; inner webs of tail feathers plain dusky; wing coverts bordered with isabella color lightly edged with cinnamon; tertials narrowly edged with grayish white; primaries (except two outer ones) finely edged with russet; secondaries more broadly edged with same; chin, throat and breast dull ashy or olive gray; abdomen and under tail coverts between a rich primrose yellow and sulphur yellow.

Measurements.—Adult male (type): Wing, 84; tail, 81; culmen, 15.5; tarsus, 21.

Adult female (topotype): Wing, 78.5; tail, 73; culmen, 16; tarsus, 20.

General notes.—The intensely black crown and greener back serve to distinguish the present form from any of the other subspecies of *M. lawrencei.* The tail is also blacker and less bordered with rufous than in *nigricapillus*, and the bill appreciably smaller. The two specimens from Boquete are the only ones I have seen of *M. l. bangsi*, but they are so different from the numerous specimens of *nigricapillus* at hand that I have no doubt of their representing another subspecies. Citations of *nigricapillus* from Panama undoubtedly refer to the present bird.

Myiarchus lawrencei platyrhynchus (Ridgway).

COZUMEL FLYCATCHER.

1885. *Myiarchus platyrhynchus* Ridgway, Proc. Biol. Soc. Wash., III, p. 23. February 26, 1885.

Type locality.—Cozumel Island, off coast of Yucatan. Type No. 102,738 U. S. National Museum (skinned from alcohol and much decolorized).

Breeding range.—Cozumel Island, Peninsula of Yucatan, and coast region of Campeche and Tabasco, to the Grijalva River. Not migratory.

Zonal distribution.—Arid and Semi-arid Tropical.

Subspecific characters.—Most like *olivascens*, but upper parts darker; back more greenish, and tail coverts, tail and wings darker and more strongly edged with russet or reddish cinnamon; bill averages broader.

Description of fresh plumage.—Crown dark brownish more or less heavily washed with olive; back slightly greenish olive; upper tail coverts broccoli brown edged and sometimes shaded with russet or reddish cinnamon; tail feathers edged externally like upper coverts; all but two outer primaries narrowly and secondaries more broadly edged externally with russet like tail; wing coverts broadly tipped with dark isabella brown; chin, throat and breast ashy gray; inner webs of tail feathers usually plain dusky, but occasional individuals have narrow buffy edges along inner borders of inner feathers. Worn specimens lose nearly or quite all the greenish shade on back and the rusty edgings to wings and tail.

Measurements of specimens from Cozumel Island:—Averages of five adult males: Wing, 81 (79-83); tail, 77.7 (74-82); culmen, 17 (16.5-17.5); tarsus, 20.2 (20-20.5).

Averages of two adult females: Wing, 75 (75); tail, 69 (69); culmen, 16 (16); tarsus, 18.5 (18-19).

Mainland specimens average about the same.

General notes.—A series of 33 specimens in the Biological Survey and National Museum collections, from various localities covering the range given above, show conclusively that the birds from this region and especially from Yucatan which were formerly referred to *lawrencei* and later to *olivascens* are identical with *platyrhynchus*, described by Mr. Ridgway from Cozumel Island. This form occupies the comparatively arid region of northern Yucatan and the adjacent coastal area to the exclusion of true *lawrencei*, which belongs to the more humid interior bordering the Cordillera.

Among the entire series only a single specimen, and it is from Cozumel Island, has a buffy border to inner webs of inner tail feathers.

In view of their wide separation, necessarily distinct origin and different environment, the close general similarity between *platyrhynchus* and *olivascens* is interesting. It is another of the many cases in which great similarity exists between widely separated forms of a species with one or more decidedly more differentiated forms occupying the intervening area. The greater humidity of the habitat of *platyrhynchus* accounts for the somewhat darker colors of this form in comparison with the paler and grayer colors of *olivascens*.

Myiarchus lawrencei querulus subsp. nov.

QUERULOUS FLYCATCHER.

Type.—No. 185,220, adult male, U. S. National Museum, Biological Survey Collection. From Los Reyes, Michoacan, Mexico. Collected February 17, 1903, by E. W. Nelson and E. A. Goldman.

Breeding range.—Southern end of Mexican tableland from central Jalisco, Michoacan, Hidalgo and state of Mexico south through Colima, Guerrero, part of Puebla and Oaxaca to Isthmus of Tehuantepec, where it passes into true *lawrencei.* Not migratory.

Zonal distribution.—Arid Tropical to Upper Sonoran.

Subspecific characters.—Color most like *platyrhynchus* but size larger (almost equalling *lawrencei* from northeastern Mexico), and inner borders of tail feathers usually more or less edged with buffy.

Description of fresh plumage.—Crown nearly clove brown, with a slight wash of olive, distinctly darker than back; back slightly grayish olive but darker and more greenish than in *olivascens;* upper tail coverts dark hair brown, more or less bordered and shaded with cinnamon; outer edges of tail feathers thinly bordered with russet; wing coverts tipped with isabella color; secondaries and all but outer primaries narrowly edged with russet; chin, throat and breast clear ash gray; abdomen and under tail coverts rich straw yellow; inner webs of inner tail feathers usually narrowly bordered with ochraceous buffy.

Young in first plumage.—The same as in *lawrencei*, but paler, especially on crown and underparts.

Measurements.—Averages of ten adult males: Wing, 86.1 (83-90); tail, 83.3 (80-86); culmen, 17.3 (17-18); tarsus, 19.6 (19-20).

Averages of five adult females: Wing, 81.6 (78-87); tail, 79.2 (76-83); culmen, 17 (16.5-17.5); tarsus, 19.4 (19-20).

General notes.—Specimens of the present form have hitherto been confused with the smaller and paler *olivascens*, but the Biological Survey series from all parts of western and southern Mexico make it plain that there are two recognizable forms on the mainland north of the Isthmus of Tehuantepec. The southern one, *querulus*, occupies an area lying between the more arid home of *olivascens* and the still more humid one of true *lawrencei.* One of the unexpected characters of *querulus* is its large size—almost the same as of *lawrencei* of northeastern Mexico, and considerably exceeding that of *olivascens* or of the representatives of *lawrencei* where their two ranges come in contact. Its large size also separates it at once from *platyrhynchus.* It is paler than *lawrencei* and with less strongly marked rufous borders to wings and tail. Some specimens, especially from Hidalgo and certain other tableland localities, sometimes lack the buffy inner edging to the tail feathers, but their large size and general coloration distinguishes them.

Myiarchus lawrencei olivascens Ridgway.

OLIVACEOUS FLYCATCHER.

1884. *Myiarchus lawrencei olivascens* Ridgway, Proc. Biol. Soc. Wash., II, p. 91.

Type locality.—Santa Efigenia, Oaxaca. Type No. 57,655 U. S. National Museum.

Breeding range.—Southern Arizona and thence south in western Mexico, west of the Sierra Madre to northern Tepic.

Migrates from northern part of its range south throughout southwestern Mexico to Chiapas and inland through Michoacan and Guerrero. Resident in southern part of breeding range.

Zonal distribution.—Lower Sonoran and Arid Tropical.

Subspecific characters.—Decidedly smaller than true *lawrencei;* upper parts grayer and rectrices only slightly if at all edged with pale cinnamon.

Description of fresh plumage.—Crown olive brown, but slightly darker than back; back grayish olive with but slight if any indication of greenish: upper tail coverts hair brown usually but not always edged with pale cinnamon; outer edges of tail feathers, secondaries and all but two outer primaries edged with slightly darker shade of cinnamon; wing coverts vary from drab to isabella color; inner webs of inner tail feathers usually plain dusky but sometimes with a slight buffy edge along inner border; chin, throat and breast ashy gray; abdomen and under tail coverts varying from sulphur yellow to straw yellow.

Measurements of specimens from southern Arizona:—Averages of ten adult males: Wing, 81.5 (76-85); tail, 77.9 (73-81); culmen. 16.6 (16-17); tarsus, 18.9 (18-20).

Averages of ten adult females: Wing, 76.4 (75-78); tail, 72.5 (70-75); culmen, 16.1 (15-17); tarsus, 18.1 (17.5-19).

General notes.—The type of *olivascens* came from Santa Efigenia, Oaxaca, close to the border of Chiapas, where the resident birds are nearly typical *lawrencei* both in size and color. The type of *olivascens* is in winter plumage and agrees in every way with birds from northwestern Mexico and southern Arizonia. From this it is practically certain that this individual was a winter visitant from the north. The birds of southern Arizona may be considered typical of the form.

M. olivascens is apparently not numerous in winter south of Guerrero. The Bangs collection contains one specimen taken on April 4, at Patzcuaro, Michoacan, which was probably a migrant. Among a series of over fifty specimens at hand only a few have indications of a buffy border along the inner edge of the tail feathers, and most of these are intergrades from along the southern border of its range where it merges into *querulus*. There is also a gradual increase southward in size.

Myiarchus lawrencei tresmariæ subsp. nov.

TRES MARIAS FLYCATCHER.

Type.—No. 156,810, adult male, U. S. National Museum, Biological Survey Collection. From Maria Madre Island, Tepic, Mexico. Collected May 5, 1897, by E. W. Nelson and E. A. Goldman.

Breeding range.—Tres Marias Islands, Tepic Ty., Mexico. Not migratory.

Zonal distribution.—Arid Tropical.

Subspecific characters.—Palest and grayest of the forms of *lawrencei*, with slight buffy borders on inner webs of inner tail feathers; bill proportionately longer and broader than in *olivascens*.

Description of slightly worn plumage.—Upperparts hair brown, only slightly darker on crown; upper tail coverts drab thinly edged with pale cinnamon; tail feathers thinly edged externally with same; inner primaries and secondaries very finely edged externally with same; wing coverts tipped with drab; chin, throat and breast dingy ash gray, duller than in *olivascens;* abdomen and under tail coverts straw yellow; inner webs of inner tail feathers usually with narrow border of buffy; bill larger and broader than in *olivascens*.

Measurements.—Adult male (type); Wing, 79; tail, 75; culmen, 18; width of culmen, 9; tarsus, 21.

Average of seven adult females: Wing, 76.1 (73-30); tail, 74.4 (70-79). culmen, 16.8 (16-18); width of culmen, 9.1 (9-9.5); tarsus, 19.6 (19-20.5);

General notes.—The present form only needs comparison with *olivascens*, from which it is easily distinguished by the characters mentioned.

Myiarchus nigriceps Sclater.

BLACK CROWNED FLYCATCHER.

1860. *Myiarchus nigriceps* Sclater, Proc. Zool. Soc. London, 1860, p. 68.

Type locality.—Pallatanga, Ecuador. Type in British Museum.

Breeding range.—Over a large part of northern South America from the valley of the Amazon to Panama (including San Miguel Island). Not migratory.

Zonal distribution.—Mainly Humid Tropical but ranging above this to 9500 feet in Peru (Biologia Cent.-Am., II, p. 96).

Specific characters.—Crown slaty black; back olive greenish; wings and tail of adult without rufous edgings.

Description of fresh plumage.—Crown slaty black; back olive greenish; upper tail coverts hair brown slightly edged with tawny olive; tail feathers edged externally with hair brown varying to isabella color; outer web of outer feather drab, paler than inner web; inner webs plain dusky; outer primaries without external edging; inner primaries with or without a fine grayish edging; secondaries narrowly edged with light drab often tinged with greenish; tertials dingy whitish sometimes inclining to drab; wing coverts drab; inner borders of wing feathers salmon buffy; chin, throat and breast ash gray; abdomen and under tail coverts canary yellow varying to sulphur yellow.

Description of young in first plumage.—Crown dull sooty black; back dingy olive; upper tail coverts sepia brown edged with dark russet; wing coverts, tertials and secondaries rusty cinnamon, palest on tertials; inner primaries thinly edged with russet; inside of wing feathers bordered with salmon buffy; tail feathers narrowly bordered on both webs by cinnamon rufous; chin, throat and breast ashy gray; abdomen and under tail coverts primrose yellow.

Measurements.—Averages of ten adult males from northern Colombia: Wing, 81.7 (80-83); tail, 76.3 (74-78); culmen, 17.1 (17-18); tarsus, 19.6 (18.5-20.5).

Averages of five adult females from northern Colombia: Wing, 77.2 (73-83); tail, 72 (68-76); culmen, 16.6 (16-17); tarsus, 19.4 (18-20.5).

General notes.—The adults of this species in size and general style of coloration resemble *M. nigricapillus* and *M. bangsi*, except that they completely lack the rufous edgings to wings and tail found in those birds. The first plumage of *nigriceps* is much like the young of *lawrencei* but the upper parts are darker and the rufous borders to the tail feathers are decidedly narrower. Whether the ranges of this species and *M. bangsi* overlap or are complementary remains to be determined.

Myiarchus brunneiceps Lawrence, Ann. Lyc. Nat. Hist. N. Y., VII, 327, June, 1861, from Lion Hill, Panama, is a synonym of *M. nigriceps*.

M. nigriceps is a wide ranging South American species with *M. lawrencei* and subspecies as its nearest relatives in North America.

VOL. XVII, PP. 51-52 MARCH 10, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW BATRACHIAN FROM SARAWAK, BORNEO.

BY THOMAS BARBOUR.

Among a small collection of Batrachians taken in Sarawak, Borneo, by Mr. W. T. Hornaday, there are two specimens of an apparently undescribed species of toad. This species is nearly related to *Nectes subasper* Tschudi, from Java.

Nectes obscurus sp. nov.

Differing from *N. subasper* in the size of the tympanum; the size of the nostrils; the width of the upper eyelid; and in the distinctness of the metatarsal tubercles.

Head rather small; snout oblique and obtusely angular; nostrils very small, opening upward and slightly outward; upper eyelid wide; space between the eyes rather broad; tympanum distinct but small, less than one-half the diameter of the eye; fingers slender, the first a very little shorter than the second; toes long and slender, united by a rather narrow membrane; subarticular tubercles distinct; two large metatarsal tubercles. When the hind limb is carried forward along the body, the tarso-metatarsal articulation reaches a considerable distance beyond the tip of the snout. Upper surfaces and sides covered with round and conical warts of unequal size, the largest evidently porous and arranged in two irregular lines on the dorsal surface. The lower surfaces are covered with rather fine granules of unequal size.

Color (alcoholic specimens), olivaceous above, lighter below; the hind legs banded and mottled with a darker color.

Type No. 2396, Barbour collection, Museum of Comparative Zoölogy, Cambridge, Mass.

IV

VOL. XVII, PP. 53-54 MARCH 21, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

HAPLOMYLOMYS, A NEW SUBGENUS OF *PEROMYSCUS*.

BY WILFRED H. OSGOOD.

The genus *Peromyscus*, as at present recognized, contains a larger number of species than any other North American genus of mammals. It has a comparatively wide range, and, although subject to numerous minor variations, preserves its essential characters with remarkable uniformity. Thus far only two subgeneric names have been proposed for subordinate groups within the genus—*Baiomys*, erected by True in 1894* for the tiny species *P. taylori*, and *Megadontomys*, proposed by Merriam in 1898† for the largest species of the genus *P. thomasi*. Both of these are well characterized, but represent aberrant types rather than assemblages of species. *Baiomys* contains only two well-marked species (each possibly divisible into several subspecies) and *Megadontomys* is represented by only the type species and two closely related forms. All the other species are at present retained in

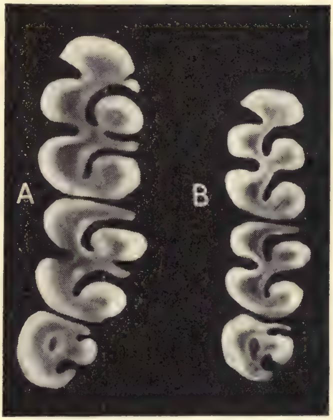

FIG. 1.—A. Upper molars of *Peromyscus* (*Peromyscus*) *felipensis*. B. Upper molars of *Peromyscus* (*Haplomylomys*) *californicus*. (About × 9½).

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*Proc. U. S. Nat. Mus., XVI, p. 758, 1894.

†Proc. Biol. Soc. Wash., XII, pp. 115–116, April 30, 1898; see also Bangs, Bull. Mus. Comp. Zool., XXXIX, p. 27, 1902, where *Megadontomys* is given generic rank.

the restricted genus *Peromyscus*, typified by the common *P. leucopus* of the eastern United States.

A small group containing two well-known species and numerous subspecies found in the arid and semi-arid regions of the southwestern United States and northern Mexico seems also worthy of subgeneric recognition. Although not differing as a group in any external characters that are diagnostic, it is sharply defined by peculiarities of the molar teeth, which are so constant and, comparatively speaking, so pronounced as to be of considerable significance.

The important forms of this group are *P. eremicus* and *P. californicus*, characterized by a less complex tuberculation of the molar teeth than in *Peromyscus* proper or in *Megadontomys*. In the ordinary type of *Peromyscus* there is a small accessory tubercle between the primary outer tubercles of the first and second upper molars. In unworn teeth these tiny tubercles are scarcely noticeable, except as viewed in profile. When the crowns of the molars become worn, however, they appear as narrow enamel loops with closely appressed sides, lying between the more or less open primary loops. These small tubercles are not present in the group heretofore loosely called the 'eremicus' group. They are also absent in *Baiomys*, which, however, is otherwise peculiar. They are developed to various degrees in various species, in some being difficult to observe, except in teeth that have been subjected to considerable wear. Apparently they are least prominent in *P. crinitus* and its close allies.

The appearance of partly worn teeth is shown in the accompanying reproduction of photographs of actual specimens. For purposes of illustration, two of the larger species were selected. In essential characters their teeth do not differ from those of the type species of their respective groups.

The new subgenus may be characterized as follows:

Haplomylomys subgen. nov.

Type.—Peromyscus eremicus (Baird), from Fort Yuma, California.

Characters.—Size medium or small; pelage usually very soft and silky; tail longer than head and body, subterete, rather thinly haired; soles of hind feet naked (at least in median line) to calcaneum, 6-tuberculate and paved with minute imbricate scales; skull with cranium rather large and rostral region relatively weak; first and second upper molars with three salient and two reëntrant outer angles at all stages of wear; small secondary tubercles never present between outer primary tubercles; lower molars correspondingly simple.

VOL. XVII, PP. 55-77 MARCH 21, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THIRTY NEW MICE OF THE GENUS *PEROMYSCUS* FROM MEXICO AND GUATEMALA.

BY WILFRED H. OSGOOD.

The mice of the genus *Peromyscus*, so well represented in the United States and so well known for their numerous specific and subspecific variations, reach their highest development south of our borders in Mexico. This is the region of their greatest abundance, both in actual numbers and in specific types. Some are closely related to forms found in the United States, but the majority are entirely different.

The thorough work of E. W. Nelson and E. A. Goldman in this region has resulted in the acquisition of very large numbers of specimens of this genus, and now for the first time it is possible to learn the number and diversity of their specific and subspecific forms. Specimens of *Peromyscus*, from Mexico and Guatemala alone, to the number of nearly 3,400, are now in the collection of the U. S. Biological Survey. This is unquestionably in excess of the combined number in all other collections in the world, and it is therefore not surprising that a comparatively large number of new forms should be found among them.

The descriptions herewith are presented in advance of a revision of the entire genus, now in preparation, in which it is hoped that all the known forms may be fully discussed.

I take pleasure in making acknowledgments to Dr. C. Hart Merriam, to whom I owe the opportunity of elaborating this rich material and to whom I am indebted for much valued criticism and advice. It was also my privilege to be somewhat associated with Dr. Merriam during his preparation of a preliminary paper on the same group several years ago,* an experience which is now of the utmost value to me. During the work I have been greatly assisted by Mr. Nelson, and the advantage of having at my disposal his intimate knowledge of the physiographic conditions of Mexico has been much appreciated.

Subgenus **Peromyscus** Gloger.

Peromyscus sonoriensis blandus subsp. nov.

Type from Escalon, Chihuahua, Mexico. Adult female, No. 57,635, U. S. National Museum, Biological Survey Collection, November 27, 1893, E. A. Goldman.

Characters.—Similar to *P. sonoriensis*,† but smaller; tail shorter (usually less than 75); color more vinaceous.

Color.—Type, in full winter pelage: Upper parts vinaceous buff, uniformly sprinkled with dusky; a narrow lateral line of vinaceous buff; lanuginous ear tufts conspicuous, mixed white and buff; under parts creamy white; ears chiefly whitish with a wide dusky area on flexure; tail sharply bicolor; feet white, ankles with traces of dusky and buffy.

Skull.—Similar to that of *sonoriensis*, but somewhat smaller; nasals averaging wider, particularly at their posterior ends.

Measurements.—Type: Total length, 145; tail vertebræ, 61; hind foot, 21. Average of seven adult topotypes: 161; 69; 21.4. Skull of type: Greatest length, 25.4; basilar length of Hensel, 19.7; zygomatic width, 12.5; interorbital constriction, 4; interparietal, 8 x 1.9; nasals, 9.8 x 2.5; bony palate, 3.5; palatine slits, 5.7 x 2; diastema, 6.7; postpalatal length, 9.1; upper molar series, 3.8.

Remarks.—This is the common short-tailed mouse of northeastern Mexico. The limits of its range have not yet been thoroughly worked out, but it is represented from numerous localities in Mexico east of the Sierra Madre and extends north to western Texas. It is easily distinguished from *P. texanus* of the same region by numerous characters, among which may be mentioned the following: Size smaller; tail shorter; color more vinaceous; pelage softer; subauricular spots more prominent and nearly always extensively white; nasals broader and flatter; premaxillæ less swollen laterally; braincase smaller. Its vinaceous color and small size distinguish it from *sonoriensis*, which is found chiefly west of the Sierra Madre.

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* These Proceedings, Vol. XII, pp. 115–125, April 30, 1898.

† Nos. $\frac{20602}{35762}$ and $\frac{20703}{35860}$ U. S. N. M., from Santa Cruz River, Sonora, have been used to represent *P. sonoriensis*.

Peromyscus sonoriensis fulvus subsp. nov.

Type from Oaxaca City, Oaxaca, Mexico. Adult male, No. 68,655, U. S. National Museum, Biological Survey Collection, June 12, 1894, E. W. Nelson and E. A. Goldman.

Characters.—Similar to *P. sonoriensis*, but color darker and more rufescent; skull with anterior part of zygoma heavier and more deeply notched by infraorbital foramen.

Color.—General color of upper parts russet, deepening in middle of back to mars brown and Prout's brown; under parts creamy white; ear tufts prominent, buffy or pale creamy; tail sharply bicolor, brown above, white below; feet and forelegs white; outer side of ankles brownish.

Skull.—Similar to that of *P. sonoriensis* but more angular; anterior part of zygoma heavier and more deeply notched by infraorbital foramen; similar to that of *P. labecula* but smaller and shorter; zygomata not so heavy nor so broadly expanding anteriorly; nasals rather short and broad.

Measurements.—Type: Total length, 167; tail vertebræ, 68; hind foot, 22. Average of 10 adults from Chalchicomula, Puebla: 162 (150–183); 71.5 (65–78); 22. Skull of type: Greatest length, 25; basilar length of Hensel, 19.5; zygomatic width, 12.8; interorbital constriction, 4; interparietal, 8 x 2.1; nasals, 10; bony palate, 3.7; palatine slits, 5.6 x 2; diastema, 6.5; postpalatal length, 8.7; upper molar series, 3.8.

Remarks.—*P. s. fulvus* is the southernmost representative of the well-known *sonoriensis* group of small short-tailed mice. It is found from Oaxaca north to Puebla and parts of Vera Cruz and Hidalgo. Its near relatives are *P. s. blandus* and *P. s. labecula.** In general terms, *blandus* is small and vinaceous, *fulvus* is medium sized and rufescent, and *labecula* is large and more inclined to duskiness. The intergradation of all three and their connection with typical *sonoriensis* are scarcely to be doubted.

Peromyscus texanus mesomelas subsp. nov.

Type from Orizaba, Vera Cruz, Mexico. Adult male, No. 58,210, U. S. National Museum, Biological Survey Collection, January 20, 1894, E. W. Nelson and E. A. Goldman.

Characters.—Most similar to *P. t. mearnsi;* color darker; tail shorter; hind foot larger; a small pectoral spot present; adolescents with an intense black dorsal stripe.

Color.—Adult: General effect of upper parts pale Prout's brown, produced by fawn ground color with a liberal mixture of dusky; sides practically unicolor with back; no definite dusky markings about head; under parts creamy white except a small but distinct pectoral spot of fawn color; ears dusky with whitish edges; feet white, ankles dusky brownish; tail bicolor. Immature: Similar in general to adult, but more sooty; sides dark mouse gray, tinged with fawn and bordered by a narrow fawn-colored lateral line; a broad stripe in median dorsal region intense black; ankles sooty; tail indistinctly bicolor.

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* Elliot, Field Col. Mus., Zoöl. Ser., III, pp. 143–144, March, 1903.

Skull.—Similar to that of *P. t. mearnsi*, but with braincase averaging slightly larger and wider; nasals rather long and palatine slits usually corresponding.

Measurements.—Type: Total length, 169; tail vertebræ, 76; hind foot, 23. Skull of type: Greatest length, 26.5; basilar length of Hensel, 20.2; zygomatic width, 13.6; interorbital constriction, 4; interparietal, 8.6 x 2.3; nasals, 10.4; bony palate, 3.8; palatine slits, 5.2 x 2; diastema, 6.9; postpalatal length, 9.1; upper molar series, 3.7.

Remarks.—Although this form is very well characterized, there seems to be no doubt that it is connected, through *P. t. mearnsi*, with *P. texanus* and others of the same group. Specimens from Rio Verde, San Luis Potosi, are quite evidently intermediate, and a series from Metlaltoyuca, Puebla, while distinctly referable to *mesomelas*, shows some tendencies toward *mearnsi*. *P. mesomelas* is also related to *P. affinis*, which is a much paler form and not apt to be confused with it. Like *mearnsi* and *affinis*, it has short and relatively harsh pelage somewhat different from that of most other Mexican species.

Peromyscus texanus castaneus subsp. nov.

Type from vicinity of Yohaltun, Campeche, Peninsula of Yucatan, Mexico. Adult male, No. 107,980, U. S. National Museum, Biological Survey Collection, December 19, 1900, E. W. Nelson and E. A. Goldman.

Characters.—Similar to *P. t. mesomelas*, but smaller and more ferruginous colored; under parts without pectoral spot; adolescents without black dorsal stripe; skull and teeth small.

Color.—Type, in fresh pelage: General color of upper parts between Prout's brown and burnt umber, clearer on sides, darker on back; ground color rich dark fawn; no definite lateral line; under parts pure white; feet white, ankles brownish. Topotype No. 107,982, in slightly worn pelage: Sides and upper parts nearly uniform cinnamon rufous with scarcely any dusky admixture and only a narrow line on back somewhat deeper colored than rest of upper parts. Immature: As in adult but grayer.

Skull.—Rather small and light; braincase relatively narrow; nasals and palatine slits short; molar teeth small; otherwise similar to *P. t. mesomelas*.

Measurements.—Average of 10 adult topotypes: Total length, 163 (156–169); tail vertebræ, 73 (68–79); hind foot, 21.5 (20–22). Skull of type: Greatest length, 25.3; basilar length of Hensel, 19; zygomatic width, 13; interorbital constriction, 4; interparietal, 8 x 2.3; nasals, 9.3; bony palate, 4; palatine slits, 4.2 x 1.9; diastema, 6.2; postpalatal length, 9.5; upper molar series, 3.5.

Remarks.—P. t. castaneus is nearly the same color as *P. cozumelæ*, which is closely related. *P. cozumelæ* differs chiefly in larger size and heavier teeth. No specimens from the humid tropical region between Orizaba and Yohaltun are at hand, but *castaneus* is not sufficiently different from *mesomelas* to warrant full specific rank. *P. affinis* is a related form of the adjacent arid tropics, and much paler than either *castaneus* or *mesomelas.*

Peromyscus melanotis zamelas subsp. nov.

Type from Colonia Garcia, Chihuahua, Mexico (altitude 6700 feet). Adult female, No. 98,197, U. S. National Museum, Biological Survey Collection, July 23, 1899, E. W. Nelson and E. A. Goldman.

Characters.—Similar in general to *P. melanotis* but coloration more sooty; size small; tail short; skull not peculiar.

Color.—Sides dark cinnamon rufous, densely clouded with sooty; broad stripe from top of head to base of tail intense black; orbital ring and base of whiskers black; sides of face suffused with sooty; a cinnamon rufous patch below eye continuous with a narrow lateral line of the same color; feet white; tail sharply bicolor, black above, white below; under parts white subdued by plumbeous under-color.

Skull.—Practically as in *melanotis;* size quite small; molar teeth particularly small.

Measurements.—Type: Total length, 160; tail vertebræ, 63; hind foot, 20. Skull of type: Greatest length, 25.9; basilar length of Hensel, 19.3; zygomatic width, 13; interorbital constriction, 4; interparietal, 8 x 2.2; nasals, 11; bony palate, 3.8; palatine slits, 5.3 x 2.1; diastema, 7; postpalatal length, 8.5; upper molar series, 3.3.

Peromyscus attwateri pectoralis subsp. nov.

Type from Jalpan, Queretaro, Mexico. Adult male, No. 81,236, U. S. National Museum, Biological Survey Collection, August 30, 1896, E. W. Nelson and E. A. Goldman.

Characters.—Similar to *P. attwateri*, but richer colored and having a prominent buffy pectoral spot; tail longer; size medium (hind foot 21–23); superficially similar to *P. eremicus;* color darker and more vinaceous; pelage slightly less silky; tail longer and more hairy; soles of hind feet naked or with slight hairiness on heel; ankles usually white; skull rather heavy; molar teeth with small accessory tubercles of subgenus *Peromyscus.*

Color.—Type, in fresh fall pelage: Ground color of upper parts pale ochraceous buff with a thick sprinkling of dusky, producing an effect nearly the shade of wood brown; sides of head behind eyes grayish; a narrow blackish orbital ring; a distinct buffy ochraceous pectoral spot usually present; feet, and in most cases ankles, white; under parts white; tail dusky above, white below.

Skull.—About as in *P. attwateri*; somewhat similar to that of *P. levipes* but smaller, with smaller teeth; lachrymal region less swollen; nasals rather long and broad; zygomata somewhat compressed anteriorly, not elbowed squarely; premaxillæ usually ending beyond nasals; interparietal rather large; audital bullæ quite small, smaller than in *levipes* or *eremicus*.

Measurements.—Type: Total length, 210; tail vertebræ, 114; hind foot, 22. Average of 10 adults from various localities: 200; 112; 21.5. Skull of type: Greatest length, 27; basilar length of Hensel, 19.7; zygomatic width, 13.7; interorbital constriction, 4.2; nasals, 9.9; bony palate, 3.7; palatine slits, 4.9 x 2; diastema, 6.3; postpalatal length, 9.4; upper molar series, 3.8.

Peromyscus attwateri eremicoides subsp. nov.

Type from Mapimi, Durango, Mexico. Adult male, No. 57,729, U. S. National Museum, Biological Survey Collection, December 15, 1893, E. A. Goldman.

Characters.—Similar to *P. attwateri*, but smaller and paler; skull small and light; audital bullæ very small; ears small; soles of hind feet naked.

Color.—Upper parts mixed pinkish buff and dusky, producing the general effect of pale broccoli brown; lateral line pinkish buff; underparts pure creamy white without trace of pectoral spot; facial region between eye and ear grayish; feet and ankles white; tail dusky above, white below. In some specimens, doubtless the younger ones, the general effect is gray, while in others a delicate shade of pinkish buff predominates.

Skull.—Similar in general to that of *attwateri* but decidedly smaller; audital bullæ very small; nasals short; interorbital constriction relatively wide; rostrum depressed.

Measurements.—Type and one topotype: Total lengths, 180; 195; tail vertebræ, 102; 111; hind feet, 20; 21. Skull of type: Greatest length, 24; basilar length of Hensel, 18; zygomatic width, 12; interorbital constriction, 3.9; interparietal, 8.3 x 3; nasals, 8.5; bony palate, 3.5; palatine slits, 4.5 x 1.5; diastema, 5.8; postpalatal length, 8.5; upper molar series, 3.5.

Remarks.—This form is readily distinguishable from both *attwateri* and *pectoralis* by its pale color, small ears, and very small skull. Its resemblance to *P. eremicus*, particularly in immature and worn pelages, is remarkable. The only external characters by which it may be distinguished are its longer, slightly more hairy tail and pure white ankles. Neither of these characters, however, is to be depended upon, as the tail in *eremicus* is often quite hairy, and the dusky on the ankle frequently so little developed as to be scarcely apparent. The molar enamel pattern, except in extremely worn teeth, is always diagnostic, *eremicoides* having the small accessory cusps and *eremicus* being without them.

Specimens examined.—Total number 10, from localities in Mexico as follows: *Coahuila*, Jimulco, 4; *Durango*, Inde, 4, Mapimi, 2.

Peromyscus polius sp. nov.

Type from Colonia Garcia, Chihuahua, Mexico. Old female, No. 98,226, U. S. National Museum, Biological Survey Collection, June 26, 1899, E. W. Nelson and E. A. Goldman.

Characters.—Somewhat similar to *P. boylei rowleyi*, but decidedly larger and grayer colored; skull large and stoutly built, with large teeth and relatively small audital bullæ.

Color.—General color of upper parts grayish broccoli brown, produced by a ground color of pinkish buff mixed with dusky; lateral line clear pinkish buff; head slightly more grayish than body, particularly on cheeks; a narrow dusky orbital ring; lanuginous tuft at base of ear occasionally tinged with white; under parts pure white; feet and ankles white; tail bicolor.

Skull.—Similar in general to that of *rowleyi*, but larger; molar teeth decidedly larger; palatine slits longer; audital bullæ actually about same size, relatively smaller; otherwise not peculiar.

Measurements.—Average of 8 adult topotypes: Total length, 218.5 (210–234); tail vertebræ, 117 (111–120); hind foot, 25.8 (25–26). Skull of type: Greatest length, 29.9; basilar length of Hensel, 22.9; zygomatic width, 14.8; interorbital constriction, 4.5; interparietal, 10.5 x 2.8; nasals, 11.6; bony palate, 4.4; palatine slits, 6 x 2; diastema, 7.4; postpalatal length, 10; upper molar series, 4.7.

Remarks.—This species nearly equals *P. difficilis* in size, but its shorter tail and ears readily distinguish it without recourse to the skull, in which the audital bullæ are scarcely more than half the size of those of *difficilis*. Its real relationship is undoubtedly with *rowleyi* and *attwateri*. It is apparently an isolated species, and is not the general Mexican representative of this group, for practically typical *rowleyi* occurs as far south at least as central Zacatecas. Its pure white ankles, as well as its large size and pale color, afford convenient characters for readily recognizing it.

Peromyscus gratus gentilis subsp. nov.

Type from Lagos, Jalisco, Mexico. Adult male, No. 78,937, U. S. National Museum, Biological Survey Collection, June 27, 1896, E. W. Nelson and E. A. Goldman.

Characters.—Similar to *P. gratus* but paler; sides of head much more fulvous; molar teeth slightly smaller.

Color.—New pelage: Upper parts pale ochraceous buff lightly mixed with dusky; middle of back with a slight concentration of dusky tipped hairs; top of head, ear tufts, etc., with a predominance of buffy; sides of head nearly clear ochraceous buff, with a slight tinge of grayish between eye and base of ear; eyelids black; under parts white; hands and feet white; ankles dusky; tail bicolor, blackish above, white below. Worn pelage: Upper parts varying from clear bright ochraceous buff on back and rump to grayish buff about head and shoulders, sometimes with a fine mixture of cinnamon tipped hairs throughout; under parts white; tail dusky brownish above, white below.

Skull.—As in typical *P. gratus*, having the same large braincase, short depressed rostrum, and relatively large audital bullæ; molar teeth slightly smaller.

Measurements.—Average of 10 adult topotypes: Total length, 201 (194–210); tail vertebræ, 111.7 (103–120); hind foot, 23.8 (23–24.5). Skull of type: Greatest length, 27.2; zygomatic width, 14; nasals, 9.5; interorbital constriction, 4.4; upper molar series, 4.

Remarks.—Apparently there are two forms of the *P. gratus* type found in Mexico, one very dark with dusky grayish head and cheeks, the other much paler with less dusky or grayish and more ochraceous on the head and cheeks. The extreme of the dark form is shown in a series from Zamora, Michoacan. Typical *gratus* from Tlalpam, Mexico, is unquestionably referable to the dark form, although not so extreme as the specimens from Zamora. The light form, which is therefore named, is most extreme in specimens from Lagos, Jalisco. Various degrees of intergradation are shown by specimens from a number of localities.

Peromyscus amplus sp. nov.

Type from Coixtlahuaca, Oaxaca, Mexico. Adult female, No. 70,158, U. S. National Museum, Biological Survey Collection, November 12, 1894, E. W. Nelson and E. A. Goldman.

Characters.—Most similar to *P. felipensis*, but very much paler; pelage long and soft; color very uniform, with scarcely any dark dorsal area; skull with somewhat inflated braincase.

Color.—Type: General effect of upper parts uniform clay color produced by a ground color of ochraceous buff and a fine 'peppery' mixture of dusky; lateral line rather broad, ochraceous buff; forehead and orbital region from posterior base of whiskers to ear grayish; anterior base of whiskers buffy; under parts creamy white with a well-developed ochraceous buff pectoral spot; feet white, ankles dusky; tail white below, dusky brownish above.

Skull.—Very similar to that of *felipensis*, but braincase slightly higher and more inflated; anterior part of skull depressed; audital bullæ large.

Measurements.—Average of 10 adult topotypes: Total length, 248 (235–260); tail vertebræ, 136 (128–145); hind foot, 27 (26–28). Skull of type: Greatest length, 30.4; basilar length of Hensel, 23; zygomatic width, 10.4; interorbital constriction, 4.5; interparietal, 10.4 x 3.7; nasals, 11.3; bony palate, 4.6; palatine slits, 6 x 2.3; diastema, 7.9; postpalatal length, 10.2; upper molar series, 4.8.

Remarks.—*P. felipensis*, to which *amplus* is related, is essentially a black mouse, whereas the predominating color of *amplus* is ochraceous buff, and except in conditions of fresh new pelage there is scarcely any black. The pelage has a peculiar quality about it which baffles description, but which differs to a certain extent in having less gloss or luster than in most species. In this respect it approaches a similar condition frequently found in specimens of the *melanophrys* type. It is easily distinguished from *melanophrys* by the absence of any definite supraorbital ridge and by its larger audital bullæ. Its relationship to *difficilis* is by no means remote, but its skull differs in the same respects as that of *felipensis.*

Specimens examined.—Total number, 65, from localities in Mexico as follows: *Oaxaca,* Coixtlahuaca, 16, Marques, 5, Tamazulapam, 13; *Puebla,* Chalchicomula, 9; *Tlaxcala,* Apixaco, 2; *Vera Cruz,* Maltrata, 5, Perote, 15.

Peromyscus bullatus sp. nov.

Type from Perote, Vera Cruz, Mexico. Adult female, No. 54,405, U. S. National Museum, Biological Survey Collection, June 3, 1893, E. W. Nelson and E. A. Goldman.

Characters.—Related to *P. truei* and *P. difficilis;* audital bullæ greatly inflated, larger than in any other known species of the genus; external ears very large; tail shorter than head and body.

Color.—Very similar to that of *P. truei,* but richer, more tawny; sides and ground color of upper parts tawny ochraceous; middle of back with considerable dusky producing a broccoli brown effect; top of head and nose broccoli brown; sides of head between base of ear and eye distinctly grayish; a narrow dusky orbital ring; under parts pure creamy white; feet white with a dusky patch on ankle; tail bicolor.

Skull.—Similar in general to that of *P. truei*; smaller than in *P. difficilis;* audital bullæ very much inflated, actually as well as relatively larger than in any other known species of the genus; braincase rounded and somewhat inflated, much as in *truei;* interorbital constriction relatively wider than in *difficilis;* nasals and palatine slits rather long; molar teeth large, actually larger than those of *truei* and nearly equalling those of *difficilis.*

Measurements.—Type: Total length, 200; tail vertebræ, 93 +; hind foot, 23; ear from notch (measured dry), 25. Skull of type: Greatest length, 28.9; basilar length of Hensel, 22; zygomatic width, 14.5; interorbital constriction, 4.5; interparietal, 10 x 3; nasals, 10.4; bony palate, 4.2; palatine slits, 5.8 x 2; diastema, 8.3; postpalatal length, 10; upper molar series, 4.3; greatest diameter of audital bullæ, 6.5.

Remarks.—The relationships of this rather remarkable mouse are clearly with *P. truei* and *P. difficilis.* Its short tail * and light color are sufficient to distinguish it from *difficilis* at a glance, and its enormous audital bullæ separate it at once from *truei.* The external ears are also very large, slightly exceeding those of *difficilis* as well as of all other species. There is only the one specimen in the collection, in spite of the fact that its habitat is in the state of Vera Cruz, where reasonably thorough collecting has been done.

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* The tail of the type is not quite perfect, having lost the extreme tip, but it is very evident that it was naturally much shorter than that of *difficilis.*

Peromyscus spicilegus evides subsp. nov.

Type from Juquila, Oaxaca, Mexico. Adult male, No. 71,426, U. S. National Museum, Biological Survey Collection, February 28, 1895, E.W. Nelson and E. A. Goldman.

Characters.—Color as in *spicilegus* except upper side of hind foot, which has a wedge-shaped dusky area extending from ankles nearly to base of toes; skull larger and heavier; teeth much larger.

Color.—Upper parts rich tawny, very slightly mixed with dusky, the dusky somewhat concentrated medially; a narrow black orbital ring and small spot at base of whiskers; under parts creamy white with a small pectoral spot of tawny; tail blackish above, white below; forearm sooty to wrist, hands white; ankle and proximal half of foot sooty except on sides.

Skull.—As in *spicilegus* but larger; molar teeth decidedly heavier.

Measurements.—Average of 5 adult topotypes: Total length, 211; tail vertebræ, 106; hind foot, 25. Skull of type: Greatest length, 29; basilar length of Hensel, 22; zygomatic width, 14.4; interorbital constriction, 4.6; interparietal, 9.3 x 3.2; nasals, 11.5; bony palate, 4.7; palatine slits, 5.6; diastema, 17; postpalatal length, 9.1; upper molar series, 5.

Remarks.—*P. spicilegus* and closely related forms are represented in the Biological Survey Collection by a large number of specimens from nearly all the mountainous parts of Mexico. Among these there is much local and individual variation, and there seems to be no strongly marked tendency to differentiation into forms occupying general areas. The small series from Juquila are markedly larger than *spicilegus*, and this difference in size is emphasized by the skull and teeth. A large series from Los Reyes, Michoacan, appears to be intermediate between *spicilegus* and *evides.*

Peromyscus spicilegus simulus subsp. nov.

Type from San Blas, Tepic, Mexico. Adult male, No. 88,088, U. S. National Museum, Biological Survey Collection, April 18, 1897, E. W. Nelson and E. A. Goldman.

Characters.—Similar in general color to *P. spicilegus;* skull smaller and with decidedly shorter nasals.

Color.—About as in *P. spicilegus;* general color of upper parts cinnamon rufous with a darker dorsal area; under parts white, usually with a small rufous pectoral spot; feet white, ankles dusky; tail usually bicolor, but sometimes not perfectly so.

Skull.—Somewhat similar to that of *spicilegus*, but smaller and more angular; nasals and rostral part of skull decidedly shorter; parietal narrower and less shelf-like; premaxillæ not exceeding nasals; zygomata rather heavy and 'squared' anteriorly; molar teeth very small; bony palate short.

Measurements.—Average of 3 adult topotypes: Total length, 208; tail vertebræ, 111; hind foot, 23. Skull of type: Greatest length, 26.3; basilar length of Hensel, 20.3; zygomatic width, 14; interorbital constriction, 4.1; nasals, 9.4; bony palate, 3.6; palatine slits, 5.6 x 2; diastema, 7; postpalatal length, 9.4; upper molar series, 3.8.

Remarks.—*P. spicilegus* is essentially a mountain animal, and is not usually found except at considerable elevations. Apparently the form from the lowlands of Tepic is its only coast representative. This is well characterized by cranial characters, although it does not differ markedly in color, being possibly a shade darker, but in this respect easily within the variation of the typical form. Specimens from Plomosas, Sinaloa, though referable to *spicilegus*, show some tendency toward *simulus*.

Specimens examined.—Total number, 10, from localities in Mexico, as follows: *Tepic*, Navarrete, 2, Rosario, 2, San Blas, 6.

Peromyscus melanophrys zamoræ subsp. nov.

Type from Zamora, Michoacan, Mexico. Adult male, No. 120,288, U. S. National Museum, Biological Survey Collection, January 20, 1903, E. W. Nelson and E. A. Goldman.

Characters.—Similar to *P. melanophrys*, but averaging slightly larger and darker; a large tawny pectoral spot present;* skull comparatively broad and heavy, teeth large.

Color.—Similar in general to that of *P. melanophrys*, but apparently somewhat darker, the difference in this respect being very slight if any. Adults with a broad band of tawny across pectoral region between forelegs. Upper side of tail more nearly black than in *melanophrys*.

Skull.—Similar to that of *melanophrys*, but slightly larger and heavier; braincase fuller and broader; audital bullæ larger; supraorbital beads less trenchant and forming ridges rather than shelves anteriorly; molar teeth larger; other characters similar.

Measurements.—Type: Total length, 260; tail vertebræ, 141; hind foot, 29. Average of 7 young adult topotypes: Total length, 259; tail vertebræ, 144; hind foot, 28.4. Skull.—Two adults: Greatest length, 31.3–32; basilar length of Hensel, 25–25.9; zygomatic width, 16.5–16.9; nasals, 12–12; upper molar series, 4.7–4.8; palatine slits, 6.6 x 2.7–7 x 2.6.

Remarks.—All the adult specimens of this form thus far examined have the tawny pectoral marking highly developed. The majority of the series from Zamora are adolescents and exceptionally dark. Even those that have not passed beyond the plumbeous juvenile pelage are decidedly darker than comparable specimens of typical *melanophrys.* Two adults, however, show only very slightly darker shades than *melanophrys.* Specimens from Zimapan, Hidalgo, are questionably referred to this form, but in cranial characters they approach *consobrinus.* Four specimens from Querendaro seem to be typical *zamoræ.*

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* The constancy of this character may be doubted, as it is of such irregular occurrence in this genus. In the present case, while not diagnostic, it seems to be a character of importance. Of 76 specimens of *melanophrys* and *consobrinus*, 4 only have pectoral spots, and these are small and indistinct. Of 19 typical specimens of *zamoræ*, all have well-marked pectoral spots except 2 plumbeous young, which have only traces.

Specimens examined.—Total number, 43, from localities in Mexico as follows: *Hidalgo*, Zimapan, 24 (aberrant); *Michoacan*, Querendaro, 4; Zamora, 15.

Peromyscus melanophrys consobrinus subsp. nov.

Type from Berriozabal, Zacatecas, Mexico. Adult female, No. 79,626, U. S. National Museum, Biological Survey Collection, July 10, 1896, E. W. Nelson and E. A. Goldman.

Characters.—Similar to *P. melanophrys*, but tail slightly shorter; skull with larger audital bullæ and other slight peculiarities.

Geographic distribution.—Southern part of Mexican tableland in the Sonoran zone.

Color.—As in *melanophrys.* Topotype No. 58,028, in full winter pelage (Dec.), has the upper parts and sides tawny ochraceous thickly lined with black to the edge of a narrow tawny lateral line; orbital ring black, sharply contrasting with a grayish area about it which extends from the base of the whiskers around the eye to the anterior base of the ear; under parts creamy white with a very small tawny pectoral spot; tail bicolor, white below, dusky above; feet creamy white, ankles dusky.

Skull.—Similar to that of *melanophrys* but somewhat shorter; nasals shorter and slightly broader; audital bullæ larger; braincase more bulging and less elongate.

Measurements.—Type: Total length, 250; tail vertebræ, 131; hind foot, 26.5. Average of 5 adult topotypes: Total length, 256; tail vertebræ, 135; hind foot, 27.5. Skull of type: Greatest length, 30.8; basilar length of Hensel, 25.3; zygomatic width, 16.3; interorbital constriction, 4.9; nasals, 11.1; upper molar series, 4.7; palatine slits, 6.6 x 2.5; bony palate, 4.4.

Remarks.—This is not a strongly marked subspecies, but its characters, such as they are, have great constancy throughout its range. It is apparently the form of the Mexican tableland, but its distribution may be continuous with that of *zamoræ* and thence with true *melanophrys.* Specimens from Zimapan, Hidalgo, appear to approach *consobrinus* in cranial characters but retain the coloration of *zamoræ.*

Specimens examined.—Total number 22 from localities in Mexico as follows: *Aguas Calientes*, Chicalote, 1; *Guanajuato*, Silao, 3; *Jalisco*, Colotlan, 1; *San Luis Potosi*, Ahualulco, 1, Hacienda La Parada, 3; *Zacatecas*, Berriozabal, 12, Monte Escobedo, 1.

Peromyscus xenurus sp. nov.

Type from Durango, Durango, Mexico. Adult female, No. 94,518, U. S. National Museum, Biological Survey Collection, July 1, 1898, E. W. Nelson and E. A. Goldman.

Characters.—Similar in size and proportions to *P. melanophrys;* ground color more nearly fawn than tawny; pectoral spot well developed; tail black except a narrow ventral line of white; hind feet clouded with dusky.

Color.—Type, in fresh pelage except on rump: Ground color of upper parts grayish fawn color, gradually becoming more grayish anteriorly, so that with the strong mixture of black through it all the effect from the middle of the back forward passes from mixed fawn color through drab to hair brown; the rump, which is still in worn pelage, is fawn color; lower cheeks bright fawn color blending with gray, which covers most of the face from the base of the ears forward to the nose; under parts white except patch of bright fawn color extending from bases of forelegs across breast; hind feet clouded with dusky brown to base of toes, which are creamy white; tail black all around except a narrow stripe of white on the under side occupying scarcely more than one-fifth of the entire surface of the tail except distally, where, the diameter of the tail being very slight, it nearly covers the under side.

Skull.—Similar in general to that of *P. m. consobrinus;* nasals noticeably shorter; anterior palatine foramina shorter; postpalatal notch shorter and wider.

Measurements.—The type and one adult topotype: Total length, 246–248; tail vertebræ, 142–140; hind foot, 28–28. Skull: Greatest length, 30 basilar length of Hensel, 23.8; zygomatic width, 115.5; interorbital width, 4.9; nasals, 10.2; upper molar series, 4.9; palatine slits, 5.7 x 2.3.

Remarks.—This species is easily distinguished from any other of the *melanophrys* group by the combination of large pectoral spot, dusky hind feet, and peculiar tail with only a narrow line of white on the under side instead of the usual equal division of the light and dark. It is the northernmost form of the *melanophrys* group, and at present is only known from two specimens from one locality, so there is doubtless much to be learned in regard to its distribution.

Peromyscus zelotes sp. nov.

Type from Querendaro, Michoacan, Mexico. Old female, No. 50,430, U. S. National Museum, Biological Survey Collection, August 8, 1892, E. W. Nelson.

Characters.—Size about the same as *P. levipes* (hind foot, 23); tail slightly longer than head and body; ears relatively about same size as in *melanophrys;* color almost exactly as in *P. melanophrys;* skull similar in general to that of *P. melanophrys* but much smaller.

Color.—Similar to that of *P. melanophrys*, but facial region more suffused with tawny and the gray very much reduced; somewhat similar to *P. levipes* but paler throughout; no trace of a pectoral spot.

Skull.—Similar in general to that of *P. melanophrys* but much smaller; audital bullæ slightly smaller; nasals shorter, interorbital space relatively wider; supraorbital beads obsolete; postpalatal notch narrow.

Measurements.—Type (old ♀): Total length, 218; tail vertebræ, 115; hind foot, 23. Skull: Greatest length, 28.3; basilar length of Hensel, 21.6; zygomatic width, 14.2; interorbital width, 4.9; nasals, 10.6; upper molar series, 4.6; palatine slits, 5.6 x 2.4.

Remarks.—This species appears to be closely related cranially to *P. melanophrys*, but differs markedly from the other forms of the group in its small feet and short tail. It requires no serious comparison with *P. levipes*, which has a widely different skull, with low shallow braincase, posteriorly compressed nasals, small bullæ, etc. Besides three from the type locality, one rather imperfect specimen from Tula, Hidalgo, seems referable to *zelotes*. It is somewhat brighter colored and differs slightly in cranial characters.

Peromyscus banderanus vicinior subsp. nov.

Type from La Salada, Michoacan, Mexico. Adult male, No. 126,503, U.S. National Museum, Biological Survey Collection, March 23, 1903, E. W. Nelson and E. A. Goldman.

Distribution.—Known from three localities in the State of Michoacan to the eastward of the range of typical *P. banderanus*.

Characters.—Darker than *P. banderanus;* skull narrower and anterior palatine foramina differently shaped; otherwise similar.

Color.—Slightly darker and more vinaceous than in *banderanus* in worn or summer pelage; decidedly darker in winter pelage, with a definite dusky median dorsal area; markings about eyes, whiskers, and ankles, sooty black instead of brown as in *banderanus;* upper side of tail sooty instead of brownish.

Skull.—Similar to that of *banderanus*, but braincase averaging slightly narrower; anterior palatine foramina more nearly elliptical, being widest in the middle and narrowing toward each end.

Measurements.—Type: Total length, 216; tail vertebræ, 107; hind foot, 27. Average of 3 young adults from La Huacana, Michoacan, 233; 117; 24.5. Skulls of two adults:* Greatest length, 31–32; basilar length of Hensel, 23.3–24.1; zygomatic width, 14.3–14; interorbital width, 5–4.8; nasals, 11.8–12.4; interparietal, 3.7 x 10.2–4.5 x 10.2; upper molar series, 4.6–4.4; palatine slits, 6 x 2.3–5.8 x 2.3.

Remarks.—This is an interior form of *banderanus*, only slightly characterized but not entirely negligible. Two specimens taken in February at Los Reyes, Michoacan, present the fullest and newest pelage and show a considerable departure from typical *banderanus*. The small series from La Salada have uniformly narrow skulls, noticeably narrower than in *banderanus*, but specimens from Los Reyes and La Huacana indicate that this is not a stable character. It seems, however, to be worth mentioning.

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* Measurements mentioned first are those of the type.

Specimens examined.—Total number, 15, from localities in Mexico as follows: *Guerrero*, Acahuizotla, 3; *Michoacan*, La Huacana, 4, La Salada, 6, Los Reyes, 2.

Peromyscus banderanus angelensis sp. nov.

Type from Puerto Angel, Oaxaca, Mexico. Adult female, No. 71,442, U. S. National Museum, Biological Survey Collection, March 13, 1895, E. W. Nelson and E. A. Goldman.

Characters.—Similar to typical *P. banderanus*, but slightly larger; skull with supraorbital bead nearly obsolete instead of being well developed.

Color.—Almost exactly as in *P. banderanus;* possibly averaging a trifle darker.

Skull.—Larger than in *banderanus;* braincase less elongate and interparietal shorter; nasals longer; supraorbital edges reduced to simple shelves, much as in *P. melanophrys*, without an elevated bead bounded by a sulcus on the inner side; molar teeth slightly larger than in *banderanus;* audital bullæ about as in *banderanus* and *aztecus*, much smaller than in *melanophrys*.

Measurements.—Type: Total length, 235; tail vertebræ, 123; hind foot, 26.5. Average of 7 adult topotypes, 235 (222–258); 120 (112–128); 27 (26.5–28). Skull.—Two adults: Greatest length, 31.3*–33.4; basilar length of Hensel, 23.4–24.9; zygomatic width, 15–15.4; interorbital width, 5.2–5; nasals, 11.7–12.8; interparietal, 3.6 x 10.6–3.4 x 11.2; upper molar series, 4.6–4.6; palatine slits, 6 x 2.4–5.7 x 2.4.

Remarks.—The naked soles of this form decide its affinities with *banderanus*, and its color is also in accord, but its skull with the supraorbital beads nearly obliterated suggests that of *P. aztecus.* Close examination of detailed characters of the skull, however, leaves scarcely any room for doubt that its proper position is with *banderanus.*

Specimens examined.—Total number, 22; 20 from the type locality and 2 from Pluma, Oaxaca.

Peromyscus mexicanus teapensis subsp. nov.

Type from Teapa, Tabasco, Mexico. Adult female, No. 100,022, U. S. National Museum, Biological Survey Collection, March 25, 1900, E. W. Nelson and E. A. Goldman.

Characters.—Similar to *P. m. tolontepecus*, but sides brighter and more contrasted with dark area in middle of back; skull with thicker, heavier rostral region.

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* Measurements mentioned first are those of the type.

Color.—Type: Sides rich chestnut shading into a well-defined blackish area in median dorsal region; a narrow black orbital ring and spot at base of whiskers; under parts slate color overlaid with creamy white (no pectoral spot in type, but of frequent occurrence among series of topotypes); tail black except a few irregular spots of yellowish white on under side; fore feet white; hind feet white except a dark brown area extending, and decreasing in width, from ankles down nearly to base of toes.

Skull.—Similar to that of *totontepecus*, but with broader nasals and generally heavier and more thickened rostral region; anterior palatine foramina usually wider; infraorbital part of zygoma rather heavier than in *totontepecus*, but not squarely 'elbowed' as in *mexicanus;* teeth about as in *totontepecus*, wider and heavier than in *mexicanus*.

Measurements.—Average of 10 adults from the type locality: Total length, 245 (234–254); tail vertebræ, 129 (121–136); hind foot, 28 (27–28.5). Skull of type: Greatest length, 33; basilar length of Hensel, 24.6; zygomatic width, 16.2; nasals, 12.7; interorbital constriction, 5.4; palatine slits, 6 x 2.9; upper molar series, 4.5; bony palate, 4.7; diastema, 8.2; postpalatal length, 11.9.

Remarks.—Represented by a series of 17 specimens containing a good percentage of adults and showing very little variation. Two specimens from Montecristo, Tabasco, are decidedly paler, much as in true *mexicanus*. The form is not strongly marked, but ranks well with the others of the same group, which is a difficult one. The vicinity of Teapa, visited by Nelson and Goldman in the spring of 1900, is already well known for the dark, rich color of the animals found there. The present subspecies is no exception.

Peromyscus yucatanicus badius subsp. nov.

Type from Apazote, Campeche, Mexico. Adult female, No. 108,016, U. S. National Museum, Biological Survey Collection, December 28, 1900, E. W. Nelson and E. A. Goldman.

Characters.—Similar to *P. yucatanicus* but darker colored.

Color.—Decidedly darker than *P. yucatanicus*, having a median dorsal area with a strong admixture of black and more or less black on the sides except a narrow lateral line which is cinnamon rufous like the general ground color; under parts faintly suffused with yellow; a narrow black orbital ring; hairs of tail blackish brown above, white below; under side of tail beneath hairs chiefly yellowish white, but somewhat irregularly blotched with dusky; feet white.

Skull.—As in *P. yucatanicus*.

Measurements.—Average of 10 topotypes: Total length, 193.4; tail vertebræ, 96.7; hind foot, 23.5. Skull of type: Greatest length, 28.2; basilar length of Hensel, 20.7; zygomatic width, 14.1; interorbital constriction, 4.7; interparietal, 9.2 x 3.1; nasals, 10.4; bony palate, 4.2;

palatine slits, 5.3 x 2.2; diastema, 7; postpalatal length, 9.9; upper molar series, 4.1.

Remarks.—This slight form doubtless owes its dark color to its habitat in a more humid region than that of true *yucatanicus.* Its range is probably limited to the region of the base of the peninsula of Yucatan, as its nearest relatives known from west of that region are the larger and quite different forms of the *mexicanus* group.

Specimens examined.—Total number 19, all from the type locality.

Peromyscus allophylus sp. nov.

Type from Huehuetan, Chiapas, Mexico. Adult female, No. 77,657, U. S. National Museum, Biological Survey Collection, February 21, 1896, E. W. Nelson and E. A. Goldman.

Characters.—Size medium (hind foot 25); tail shorter than head and body; ears moderate, scantily haired; coloration dark; tail dusky blackish, unicolor, covered with small imbricate scales, much as in *Oryzomys;* proximal third of soles of hind feet finely haired; skull rather long and narrow; teeth very small.

Color.—Sides mummy brown, deepening toward middle of back, causing a rather distinct median dorsal line of blackish brown; under parts yellowish white over slate-color, the latter showing through; tail dusky blackish, unicolor; a black orbital ring and antorbital spot; feet whitish, scantily haired; ankles dusky.

Skull.—Rather long and narrow; braincase elevated; infraorbital notch scarcely evident; nasals rather short, slightly exceeded by premaxillæ; no supraorbital ridge; palatine foramina rather large, longer than bony palate; audital bullæ small, smaller than in *aztecus* or *mexicanus;* molar teeth very small; interparietal small.

Measurements.—Type: Total length, 202; tail vertebræ, 95; hind foot, 25. Skull: Greatest length, 29.8; basilar length of Hensel, 22.5; zygomatic width, 14.5; interorbital constriction, 5; nasals, 11; bony palate, 4; palatine slits, 6 x 2.4; diastema, 8.2; postpalatal length, 10.5; upper molar series, 4.

Remarks.—It is difficult to be certain what are the affinities of this peculiar species. But for the size of its ears and shortness of its tail, it might well pass for an *Oryzomys* of the *O. chapmani* group. Its dark, scaly tail immediately suggests *Oryzomys*, and the character and color of its pelage bear out the resemblance. Its skull, however, is that of an ordinary type of *Peromyscus* without any striking characters. It seems probable that its closest relationship is with the *mexicanus* group, though it might easily be a northern member of some Central American group not yet known. It agrees in some respects with the description of *P. gymnotis* Thomas, from Guatemala. Another species from southern Chiapas agrees with this description much more closely, however, and for present purposes has been assumed to be identical with true *gymnotis.*

Peromyscus lophurus sp. nov.

Type from Todos Santos, Guatemala. Adult male, No. 77,219, U. S. National Museum, Biological Survey Collection, December 30, 1895, E. W. Nelson and E. A. Goldman.

Characters.—Most similar to *P. lepturus*, but smaller and paler; tail long and covered with comparatively long soft hairs, and terminating in a distinct pencil; pelage soft and 'woolly' and rather dull and lusterless; skull with large interparietal and short nasals.

Color.—Type: General effect of upper parts between wood brown and fawn color, with a small dusky area in middle of back; lateral line pale ochraceous buff; under parts white; no pectoral spot; tail sepia brown, unicolor; forearm dusky to wrist, fore feet white; hind feet dusky brownish to base of toes; toes white; orbital ring dusky black, rather narrow, but expanded into a distinct spot in front of eye.

Skull.—Similar to that of *lepturus*, but smaller and with rostral part decidedly shorter; molar teeth actually about same size, relatively larger; interparietal very large. Compared to that of *P. levipes*, the skull of *lophurus* is shorter, with shorter nasals and heavier infraorbital region; the teeth are decidedly heavier and longer and the interparietal larger.

Measurements.—Average of 4 adult topotypes: Total length, 208; tail vertebræ, 105; hind foot, 24.5; ear from notch, 16. Skull of type: Greatest length, 27.5; basilar length of Hensel, 20.8; zygomatic width, 14.7; interorbital constriction, 4.3; interparietal, 10 x 4.5; nasals, 10; bony palate, 4; palatine slits, 5.4 x 2; diastema, 6.5; postpalatal length, 9.6; upper molar series, 4.7.

Remarks.—This very distinct species may be easily recognized by its crested tail and usually by the absence of white on the under side of the tail. All the specimens from Todos Santos have unicolor tails, but 2 from Calel are quite distinctly bicolor, and among 4 from San Cristobal, 2 have unicolor and 2 imperfectly bicolor tails, indicating that this character is not invariable. The character of the pelage differs somewhat from most of the smaller species of *Peromyscus* in being dull and soft without the usual gloss, and although rather short it is fine and slightly 'woolly.'

Specimens examined.—Total number, 15, from localities as follows: Pinabete, Chiapas, Mexico, 5; San Cristobal, Chiapas, Mexico, 4; Calel, Guatemala, 2; Todos Santos, Guatemala, 6.

Peromyscus simulatus sp. nov.

Type from Jico, Vera Cruz, Mexico (altitude 6000 feet). No. 55,028, U. S. National Museum, Biological Survey Collection, July 12, 1893, E. W. Nelson.

Characters.—A miniature of *P. lophurus* (hind foot 21); dark markings lightly more intense; skull and teeth very small; tail clothed with long, soft hairs and crested as in *lophurus;* audital bullæ relatively large.

Color.—Almost exactly as in *P. lophurus;* dark markings of feet and face slightly more intense; tail chiefly brown, but with a narrow line of white on under side.

Skull.—Size very small; similar in general to that of *P. lophurus*, but with more inflated braincase and depressed rostrum; audital bullæ relatively larger; interorbital constriction relatively wider; teeth very small.

Measurements.—Type: Total length, 169; tail vertebræ, 87; hind foot, 21; ear from notch, 14.3. Skull: Greatest length, 24.4; basilar length of Hensel, 18; zygomatic width, 12.5; interorbital constriction, 4.3; interparietal, 8.2 x 3; nasals, 9; bony palate, 3.5; palatine slits, 4.6 x 1.7; diastema, 6; postpalatal length, 8; upper molar series, 8.9.

Remarks.—This small species is not closely related to any known species except *P. lophurus*, of which it is almost an exact miniature. Its skull is even smaller than that of *P. melanotis*, which occurs in the same region. It has, however, no relationship whatever to *melanotis*. Its small size, crested tail, and dark brown feet are amply sufficient to distinguish it from all other known species.

Peromyscus melanocarpus sp. nov.

Type from Mount Zempoaltepec, Oaxaca, Mexico (altitude 8000 feet). Young adult, No. 68,610, U. S. National Museum, Biological Survey Collection, July 8, 1894, E. W. Nelson and E. A. Goldman.

Characters.—Similar to *P. megalops*, but smaller and darker colored; hind feet slightly darker; fore feet decidedly more so, the blackish extending to base of digits; tail usually dusky all around or with only traces of paleness beneath; pelage long and soft.

Color.—Ad. ♂ No. 68,627, July 17: General effect of upper parts dark blackish mummy brown, slightly darker along middle of back; actual color of subterminal zone of hairs cinnamon rufous, which is almost lost in the general effect by the many black-tipped hairs and the dark plumbeous undercolor which shows through the thin subterminal zone; under parts deep blackish slate washed with creamy white, producing an effect which varies from olive gray to slate gray; pectoral region usually rich cinnamon rufous; an intense black line extending from nostrils through base of whiskers and eye; tail covered with short, bristly, blackish hairs scarcely paler below than above; scales of tail usually dusky all around, sometimes with slight irregular patches of paler; fore and hind feet dusky brownish to base of toes.

Skull.—Apparently very similar to that of *megalops;* nasals slightly shorter and more compressed posteriorly; superficially similar to *totontepecus*, but differing as follows: nasals shorter and nearly always ending in advance of the orbits about on a plane with the infraorbital foramen; frontal wider and with decidedly greater development of supraorbital shelves; braincase wider; anterior palatine foramina much longer; molar teeth larger.

Measurements.—Type (not quite adult): Total length, 241; tail vertebræ, 125; hind foot, 27. Ad. ♂ from Totontepec, Oaxaca: 262; 132; 30. Skull of type: Greatest length, 31.6; basilar length of Hensel, 24.3; zygomatic width, 15.2; nasals, 12; interorbital constriction, 5.4; palatine slits, 7.3; upper molar series, 5.

Remarks.—This mountain species is about the size of *P. m. totontepecus*, with which it ranges to some extent, but is much more closely related to *megalops* and *auritus*, as indicated by its cranial characters and its more bristly tail. Its most diagnostic character, however, is the extent of dusky brownish on the fore feet, which is almost unique. In some specimens the ends of the toes and the outer side of the metacarpus are the only parts not occupied by the dark color. The pelage is long and lax like that of many other mountain forms. The type was taken at 8000 feet altitude. Five additional specimens from Totontepec on the north slope of the same mountain at 6500 feet altitude are also in the collection. *P. lepturus*, which also occurs on Mt. Zempoaltepec, is smaller than *melanocarpus* and differs in numerous cranial characters, among the most obvious of which are: Braincase smaller and narrower, interorbital constriction narrower, nasals shorter, supraorbital beads less developed.

Peromyscus altilaneus sp. nov.

Type from Todos Santos, Guatemala (altitude 10,000 feet). Adult male, No. 76,856, U. S. National Museum, Biological Survey Collection, December 30, 1895, E. W. Nelson and E. A. Goldman.

Characters.—Similar to *P. melanocarpus*, but smaller and with shorter and less hairy tail; fore feet entirely white; hind feet with much more white than in *melanocarpus;* skull slightly smaller and more slender; similar to *guatemalensis* but much smaller.

Color.—As in *melanocarpus*, but tail blotched with yellowish white below, much as in *mexicanus;* fore feet and part of forearm white; hind foot with a V-shaped dusky mark extending from ankle about half way to the base of the toes, remainder of foot white; pectoral spot strongly developed in type.

Skull.—Similar to that of *melanocarpus*, but slightly smaller throughout; nasals relatively more expanded anteriorly; braincase slightly higher and more inflated and rostral region more depressed; anterior palatine foramina shorter; infraorbital plate very narrow.

Measurements.—Type: Total length, 228; tail vertebræ, 115; hind foot, 28. Skull: Greatest length, 31; basilar length of Hensel, 24; zygomatic width, 14.6; interorbital constriction, 5; nasals, 11.5; bony palate, 4.8; palatine slits, 6 x 2.7; diastema, 8.2; postpalatal length, 11.2; upper molar series, 4.6.

Remarks.—The type of this species is the only specimen known at present. Its only close relationship is with *P. melanocarpus*, to which it is very similar except in regard to the color of the wrists and fore feet. From *P. lepturus* it differs in darker color, strongly developed pectoral spot, shorter, less hairy tail, and in the following cranial characters: Parietals larger and wider, with suggestions of a bead at orbital edges; braincase more inflated; infraorbital plate much narrower; audital bullæ smaller; teeth smaller. It resembles *guatemalensis* superficially, but is so decidedly smaller as to require no serious comparison with that species.

Subgenus **Haplomylomys** Osgood.

Peromyscus goldmani sp. nov.

Type from Alamos, Sonora, Mexico. Adult female, No. 96,340, U. S. National Museum, Biological Survey Collection, December 19, 1898, E. A. Goldman.

Characters.—Similar in general to *P. eremicus anthonyi;* size larger (hind foot 24 in type); pelage somewhat coarser; color more fulvous and more uniform; heel slightly hairy; tail long and cylindrical, covered with short hairs; skull relatively heavy and rather elongate.

Color.—Entire upper parts and sides ochraceous buff finely mixed with black, much darker and richer than in *anthonyi* and without the grayish cast usually so characteristic of the *eremicus* group; under parts creamy white with a small ochraceous buff pectoral spot.

Skull.—Larger, longer, and narrower than in *eremicus* or *anthonyi*; braincase relatively much narrower; nasals longer and more compressed posteriorly; interorbital constriction narrow; bony palate rather short.

Measurements.—Type: Total length, 217; tail vertebræ, 117; hind foot, 24. Skull of type: Greatest length, 27.3; basilar length of Hensel, 21.1; zygomatic width, 14.2; interorbital constriction, 4; interparietal, 8.6 x 3.2; nasals, 9.6; bony palate, 4.2; palatine slits, 5 x 2.1; diastema, 6.6; postpalatal length, 10; upper molar series, 4.

Remarks.—The color of this species is more like that of *P. spicilegus* than *P. e. anthonyi*, but its skull and teeth show it to be a member of the *eremicus* group.

Peromyscus eremicus phæurus subsp. nov.

Type from Hacienda La Parada, San Luis Potosi, Mexico. Adult female, No. 50,438, U. S. National Museum, Biological Survey Collection, August 20, 1892, E. W. Nelson.

Geographic distribution.—Middle portion of the Mexican tableland in the States of San Luis Potosi, Zacatecas, and Nuevo Leon.

General characters.—Similar to *P. eremicus* but darker, with tail uniform blackish brown above and below instead of decidedly bicolor as in *eremicus* or indistinctly bicolor as in some specimens of *P. e. anthonyi.*

Color.—Similar in general to *eremicus*, but shades of buff deeper and entire upper parts much more heavily mixed with black; under parts except tail white; pectoral spot not present; tail blackish brown above and below, this most evident in winter pelage, when the hairiness of the tail is best developed; feet white, ankles dusky.

Skull.—Practically as in *eremicus* and *anthonyi*.

Measurements.—Average of 9 adults: Total length, 189 (176–195); tail vertebræ, 98 (92–103); hind foot, 21.

Remarks.—This form is the southernmost representative of the *eremicus* group. Its range is practically continuous with that of *eremicus*, which extends from west Texas down through Chihuahua, but it is cut off by mountain ranges from *anthonyi*, which, curiously, it most closely resembles. The extreme form of *anthonyi* from southern Sonora occasionally has the distal third of the tail black all around, and thus very much resembles *phæurus*. This is probably an accidental parallelism, as is also shown by some specimens of *fraterculus* which are strikingly like *anthonyi*, although there is even greater isolation in this case.

Specimens examined.—Total number, 27, from localities in Mexico, as follows: *Coahuila*, Sabinas 2, Saltillo 2; *San Luis Potosi*, Ahualulco, 2, Hacienda la Parada, 7, Jesus Maria, 7; *Nuevo Leon*, Doctor Arroyo, 5; *Zacatecas*, Canitas, 2.

Subgenus **Baiomys** True.

Peromyscus musculus nigrescens subsp. nov.

Type from Valley of Comitan, Chiapas, Mexico. Adult female, No. 76,827, U. S. National Museum, Biological Survey Collection, December 9, 1895, E. W. Nelson and E. A. Goldman.

Characters.—Similar to *P. musculus* and *P. m. brunneus*, but darker and more sooty; skull slightly characterized.

Color.—Upper parts mixed vandyke brown and sooty blackish, slightly more sooty on middle of back; under parts cream buff, to roots of hairs in middle of belly, on tips only at sides; tail dusky above, paler below.

Skull.—Slightly smaller and more elongate than in *P. musculus* and *P. m. brunneus;* braincase narrower; rostrum longer; palatine slits longer and bony palate correspondingly shorter; interorbital space narrower.

Measurements.—Average of 10 adult topotypes: Total length, 115.5 (113–120); tail vertebræ, 43 (40–45); hind foot, 15 (14.5–16). Skull of type: Greatest length, 20.1; basilar length of Hensel, 15.2; zygomatic width, 10.5; interorbital constriction, 3.4; nasals, 8; interparietal, 6.4 x 2.1; palatine slits, 4.3; bony palate, 2.8; upper molar series, 3.2.

Remarks.—This very dark colored mouse is represented by large numbers of specimens from southern Oaxaca, Chiapas, and parts of Guatemala.

Peromyscus allex sp. nov.

Type from Colima, Colima, Mexico. Adult female, No. $\frac{33429}{45452}$, U. S. National Museum, Biological Survey Collection, March 7, 1892, E. W. Nelson.

Characters.—Color as in *P. musculus;* size decidedly smaller; skull small, light, and slender.

Color.—Exactly as in *P. musculus.*

Skull.—About equal in size to that of *P. taylori*; braincase narrower and more elongate; decidedly smaller than in *P. musculus*: nasals very short; audital bullæ very small; molar teeth small.

Measurements.—Type: Total length, 113; tail vertebræ, 47; hind foot, 14; ear from notch (dry), 9.7. Average of 6 topotypes: 104; 44; 13.4. Skull of type: Greatest length, 18.4; basilar length of Hensel, 14.6; zygomatic width, 9.6; interorbital constriction, 3.2; nasals, 6.3; interparietal, 5.5 x 1.3; palatine slits, 3.7; bony palate, 3; upper molar series, 3.

Remarks.—This diminutive species occurs with *P. musculus* at Colima, the type locality, and at other localities in western Mexico. It is represented chiefly from the States of Colima and Jalisco, but its range has not been thoroughly worked out and it seems quite possible that it may be found over a considerable area. Apparently it is closely related to *P. paulus*,* the description of which indicates an animal of about the same size but of different color.

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*Allen, Bull. Am. Mus. Nat. Hist., XIX, pp. 598-599, November 12, 1903.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF FIVE NEW MAMMALS FROM MEXICO.

BY E. A. GOLDMAN.

The mammals described below were collected by E. W. Nelson and myself in the course of field work for the Biological Survey in southern Mexico. The wood rats all belong to the *ferruginea* * group, of which *Neotoma tenuicauda* is also a member. The *Liomys* is an additional species of the *pictus* group. For the opportunity to describe these new forms I am indebted to Dr. C. Hart Merriam, under whose supervision the field work has been carried on.

Neotoma picta sp. nov.

Type from mountains near Chilpancingo, Guerrero, Mexico (altitude, 10,000 feet). Adult male, No. 70,050, U. S. National Museum, Biological Survey Collection, December 20, 1894, E. W. Nelson and E. A. Goldman. Original number 7179.

Characters.—Size medium; color rich orange-rufous to ferruginous of Ridgway; tail long and slender, covered with short hairs; ears rather small. Closely related to *N. tenuicauda* but slightly larger; color very much brighter. Somewhat similar to *N. ferruginea*, but smaller and brighter colored; outer sides of forearms and hind legs not dusky as in *N. ferruginea.*

Color.—Type: Ground color of upper parts rich orange-rufous (varying in some specimens to ferruginous) of Ridgway, brightest on cheeks, shoulders, and along sides, darkened on face, top of head, and along back

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*Specimens from Volcan Santa Maria, Guatemala, which agree well with the original description of *Neotoma ferruginea*, have been assumed to be nearly typical and used for comparison.

by a rather abundant sprinkling of black-tipped hairs; under parts nearly pure white (in some specimens suffused with salmon), the plumbeous basal color showing through indistinctly; axillæ orange-rufous; ears covered with short dusky hairs; tail indistinctly bicolor (occasionally concolor), dusky above, paler below; fore feet yellowish white; hind feet to toes irregularly clouded with dusky or pale fulvous, the toes white.

Skull.—The skull indicates close relationship to *N. tenuicauda*, but is slightly larger and the nasals are longer. Compared with *N. ferruginea*, the skull is smaller, with narrower frontal region.

Measurements.—Type: Total length, 368; tail vertebræ, 180; hind foot, 37. Average of eight adult females from the type locality: Total length, 344 (338–355); tail vertebræ, 170 (166–182); hind foot, 34 (33–35.5). Skull of type: Greatest length, 43.3; basilar length of Hensel, 35; zygomatic breadth, 23; length of nasals, 17.4; interorbital breadth, 5; palatal length, 8.6; diastema, 11.9; upper molar series on alveolus, 8.7.

Specimens examined.—Total number, 31, all from the State of Guerrero, as follows: Mountains near Chilpancingo (type locality), 16; Omilteme, 15.

Remarks.—*Neotoma picta* appears to be more closely related to *N. tenuicauda* than to any other known form, but its remarkable color is alone sufficient to distinguish it from that species.

Neotoma isthmica sp. nov.

Type from Huilotepec, 8 miles south of Tehuantepec, Oaxaca, Mexico (altitude, 100 feet). Adult female, No. 73,187, U. S. National Museum, Biological Survey Collection, May 5, 1895, E. W. Nelson and E. A. Goldman. Original number 7843.

Characters.—Size rather large; color orange-rufous to ferruginous; tail long, moderately stout, thinly haired and coarsely scaly; ears medium. Similar to *N. ferruginea*, but much brighter colored and without dusky forearms and hind legs; skull narrower and heavier. In color closely resembling *N. picta*, but larger, with stouter, more coarsely scaly tail, and differing in cranial characters.

Color.—Type (in worn pelage): Upper parts in general between orange-rufous and ferruginous of Ridgway, fading to grayish fulvous on outer sides of forearms and hind legs; face, top of head, and back thinly sprinkled with blackish hairs; under parts, including upper lip, lower sides of face, and inner sides of fore and hind legs, soiled white; tail indistinctly bicolor, brownish above, paler below; fore feet pure white; hind feet to toes clouded with dusky (in some specimens pure white), the toes white.

Skull.—Similar to that of *N. ferruginea* but narrower, heavier, and more arched across anterior roots of zygomata. Compared with *N. picta* the skull is larger, longer, heavier, relatively narrower, and more arched across anterior roots of zygomata; frontal region flatter posteriorly; braincase less smoothly rounded.

Measurements.—Type: Total length, 395; tail vertebræ, 198; hind foot, 38. Average of nine adult males and females from the type locality:

Total length, 368 (355–390); tail vertebræ, 182 (166–198); hind foot, 37 (35–39). Skull of type: Greatest length, 48.4; basilar length of Hensel, 38.4; zygomatic breadth, 23.7; length of nasals, 19; interorbital breadth, 6.2; palatal length, 8.3; diastema, 12.9; upper molar series on alveolus, 9.

Specimens examined.—Total number, 19, all from the state of Oaxaca, as follows: Huilotepec (type locality), 16; Juchitan, 3.

Neotoma parvidens sp. nov.

Type from Juquila, Oaxaca, Mexico (altitude, 5000 feet). Adult female, No. 71,586, U. S. National Museum, Biological Survey Collection, February 27, 1895, E. W. Nelson and E. A. Goldman. Original number 7587.

Characters.—Size very small; color ferruginous; tail rather short and slender, covered with short hairs; ears small. Closely resembling *N. picta* in color but very much smaller; skull smaller and lighter, with narrower nasals and smaller teeth.

Color.—Upper parts ferruginous (varying along sides in some specimens to orange-rufous) of Ridgway, becoming brownish fulvous over outer sides of forearms and hind legs; face, top of head, and back (in some specimens the sides also) rather thickly sprinkled with black-tipped hairs; underparts, including upper lip and part of cheeks, nearly pure white, the plumbeous basal color showing through indistinctly; axillæ orange-rufous; ears covered with short dusky hairs; tail dusky above, paler below; fore feet and toes of hind feet yellowish white; hind feet to toes irregularly clouded with dusky (in two out of five specimens, pure white).

Skull.—Similar in general form to that of *N. tenuicauda*, but smaller, lighter, and usually more arched; interorbital breadth relatively greater; rostrum usually more decurved, nasals narrower and more wedge-shaped; teeth relatively much smaller.

Measurements.—Type: Total length, 295; tail vertebræ, 141; hind foot, 31. Average of five adult males and females from the type locality: Total length 300 (282–317); tail vertebræ, 149 (141–157); hind foot, 31 (30–32). Skull of type: Greatest length, 40.5; basilar length of Hensel, 32.5; zygomatic breadth, 20.7; length of nasals, 15.2; interorbital breadth, 5.3; palatal length, 7.3; diastema, 11.3; upper molar series on alvelous, 7.4.

Specimens examined.—Five, all from the type locality.

Neotoma tropicalis sp. nov.

Type from Totontepec, Oaxaca, Mexico (altitude, 6500 feet). Adult male No. 68,593, U. S. National Museum, Biological Survey Collection, July 17, 1894, E. W. Nelson and E. A. Goldman. Original number 6468.

Characters.—Size small; tail rather short, slender, and thinly haired; ears rather small. In color closely resembling *N. tenuicauda* but brownish of upper parts encroaching on under parts; skull somewhat similar to that of *N. tenuicauda*, but nasals longer and narrower and premaxillæ longer.

Color.—Upper parts dark brown, becoming brownish fulvous on cheeks, shoulders, and along sides, this color encroaching on under parts posteriorly, leaving a narrow, whitish area along the median line of the belly; rest of under parts, except a salmon colored band across pectoral region in the type, dull whitish (the plumbeous basal color showing through); ears faintly edged with whitish; tail nearly unicolor, dusky above, slightly paler below; fore and hind feet clouded with dusky, the toes of hind feet whitish.

Skull.—Somewhat like that of *N. tenuicauda*, but nasals more wedge-shaped, much longer and narrower, reaching plane of lachrymals; ascending branches of premaxillæ very long, reaching beyond plane of lachrymals; frontal region broader and flatter posteriorly; teeth smaller. Compared with that of *N. parvidens*, the skull is larger and flatter, braincase larger and more smoothly rounded; nasals and ascending branches of premaxillæ longer; teeth larger.

Measurements.—Type: Total length, 325; tail vertebræ, 156; hind foot, 34. Skull of type: Greatest length, 41.3; basilar length of Hensel, 33.5; zygomatic breadth, 22.2; length of nasals, 16.5; interorbital breadth, 5.8; palatal length, 7.9; diastema, 11.2; upper molar series on alveolus, 8.3.

Specimens examined.—Two, from the type locality.

Liomys parviceps sp. nov.

Type from La Salada, 40 miles south of Uruapan, Michoacan, Mexico. Adult female, No. 126,477, U. S. National Museum, Biological Survey Collection, March 19, 1903, E. W. Nelson and E. A. Goldman. Original number 16,194.

Characters.—Size very small; color reddish; tail of moderate length. Similar to *L. plantinarensis* but less fulvous; skull smaller; tail slightly longer; hind foot shorter, 6- instead of 5-tuberculate.

Color.—Upper parts grizzled brownish fulvous; under parts, fore and hind feet, white; fulvous lateral line rather faint; ears edged with whitish; tail distinctly bicolor, brownish above, whitish below.

Skull.—Smallest of the known species of the genus. Similar to that of *L. plantinarensis*, but smaller and flatter; braincase less expanded; interparietal smaller; rostrum less decurved; nasals more arched anteriorly, notched posteriorly as in *L. plantinarensis*.

Measurements.—Type: Total length, 202; tail vertebræ, 110; hind foot, 24. Average of five adult males and females from the type locality: Total length, 204 (197–214); tail vertebræ, 105 (102–110); hind foot, 24 (24). Skull of type: Greatest length, 28.3; basilar length of Hensel, 20; zygomatic breadth, 13; length of nasals, 11.5; interorbital breadth, 6.7; interparietal, 3.2 x 8.3; upper molar series on alveolus, 4.2.

Specimens examined.—Total number, 16, from the following localities: La Salada, Michoacan (type locality), 11; Rio Balsas, Guerrero, 5.

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PROCEEDINGS

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THE VEGETATIVE VIGOR OF HYBRIDS AND MUTATIONS.*

BY O. F. COOK.

Under what has been termed a kinetic theory of evolution † it has been held that the condition most favorable to evolutionary progress is that found in natural species containing numerous individuals, widely distributed and freely interbreeding. The individual diversity of members of large assemblages of organisms is greater than when interbreeding is confined to narrow limits, but under persistent close breeding uniformity or "fixity" of type is followed, eventually, by very pronounced and abrupt variations, and by a decline of reproductive power.

On the other side of the evolutionary highway corresponding phenomena abound. Interbreeding among the normally diverse members of a species in nature strengthens the organism and aids in distributing variations throughout the species, but when individuals from small, close-bred groups are crossed their characters may prove antagonistic, and not to be combined or averaged in the offspring, as discovered by Mendel. When still more remote types are brought together the resulting hybrids are often abnormally diverse, and may have characters possessed by neither of the parents. Because pronounced variations are thus obtainable both by narrow inbreeding and by wide crossbreeding these extreme stages have been thought to have great evolutionary significance, but the degenerative character of organisms which have suffered such abnormally abrupt changes is rendered obvious by their inability to propagate their kind.

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* Read before the Biological Society of Washington, November 28, 1903.

† Science, N. S., **13**: 969, 1901; Popular Science Monthly, **63**: 18, 1903.

The partial or complete sterility, both of hybrids and of "sports" or "mutations," as the variations of inbred plants are now called, has long been a matter of common knowledge among breeders of plants and animals, but current evolutionary theories do not associate the two groups of phenomena as belonging to corresponding sidepaths of the evolutionary thoroughfare. The failure to recognize this relationship is to be explained partly by the general carelessness in applying such terms as "hybrid" to a great variety of evolutionary conditions,* and partly by the fact that in spite of their declining reproductive power, both mutations and hybrids often show striking vegetative vigor.

ECONOMIC VALUE VERSUS REPRODUCTIVE FERTILITY.

To recognize and, if possible, to account for this paradox is of practical as well as of theoretical importance, since the propagator, like the biologist, commonly reasons that the more rapid and vigorous the growth of the young plant, the earlier and the larger the harvest. Indeed, this calculation is generally correct, since a large proportion of our domesticated species are not valued for their reproductive efficiency, but for one or another of their vegetative parts. Even in our horticultural crops, such as apples, pears, cherries, plums, berries, oranges, pineapples, and bananas, which we think of as being planted for their fruits, it is not the seed itself which is utilized or desired, but the fleshy pulp. The decline of reproductive fertility, or tendency toward seedlessness, is not looked upon as a disadvantage, if the plant can be propagated asexually, but often lends special value to a new variety, particularly if correlated with vegetative vigor.

The great economic value of a seedless grape or orange need not obscure, however, the obvious fact that the plant itself is degenerate, and would have no prospect of self-perpetuation under natural conditions.† Neither should the utility of some degenerate plants prevent our appreciating the worthlessness of others, or keep us any longer from realizing that methods of breeding calculated to increase the commercial importance of one plant may be utterly destructive to another. A seedless cherry might bring a fortune to its discoverer, but a vigorous and beautiful seedless coffee tree found recently in Costa Rica is of use only in adding emphasis to the fact that all the known variations of this plant which have appeared in cultivation are less fertile than the normal type of the species, and hence are described properly as degenerative, in the original, practical sense of this term, and in its evolutionary sense as well.

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* Popular Science Monthly, **63** : 225, 1903.

† Mr. Walter T. Swingle notes that in some of the asexually propagated cacti of Arizona vegetative vigor might more than compensate for seedlessness, so that nearly sterile hybrids or mutations would have a distinct advantage over the parental types.

SELECTIVE EXPLANATION OF CULTURAL "IMPROVEMENT."

The evolutionary significance of the degeneracy of a large proportion of the domestic varieties of plants and animals has also been obscured by theories that their " improved " characters have been given to them by selection. It is true that the changes have taken place along with a process of selection, but nobody has furnished any tangible reason for believing that the selection causes the changes or can cause them. Neither has it been shown that the new conditions of growth are of much evolutionary significance. The important and practical difference between nature and domestication seems to be that the latter implies narrow inbreeding and the artificial preservation of varieties which in nature would either not appear at all or which would not be able to survive.

The continued popularity of the selective theory and the consequent disregard of the degenerative character of domestic varieties are due, in large measure, to the fact that so many of them possess a vegetative vigor as great or greater than that of the wild type of the species. A sterile hybrid, the mule,* furnishes a popular symbol of strength and hardiness, and scores of similar instances might be enumerated. One of the most striking is Burbank's hybrid walnut tree, which grows several times as fast as either of its parents, but produces no fertile seeds.

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*An authentic instance of the fertility of a female mule was encountered last year in the vicinity of Tapachula, in the Soconusco district of the State of Chiapas, Mexico. The colt was alive at birth and apparently normal, but did not survive.

PHYSIOLOGICAL EXPLANATION OF VIGOR OF HYBRIDS.

A physiological explanation of the vigor of sterile hybrids has been sought by supposing that the bodily energy which in other plants or animals goes into reproductive parts and processes here gives a reinforcement of growth, as often occurs after castration. This idea might find some application with the adult organism, but the unusual vigor is often apparent far in advance of the reproductive stage, and even in very young individuals. A nursery of the coffee mutation called " Maragogipe " affords a striking contrast by the side of one planted with the parent "Arabian " type, and a similar precocity of vegetative vigor is found in many hybrids. The diminution of reproductive efficiency is not, evidently, the only difference, and further facts must be taken into consideration if we are to gain a suggestion of how the body of an organism may gain in vigor after the power of perpetuating the type has declined.

THE STIMULATION OF GROWTH BY CROSSING.

The general antithesis between growth and reproduction does not suffice to explain the vigor of sterile hybrids, but by considering the cytological phase of these processes a somewhat more promising clue may be found.

Growth consists, among the higher plants and animals, of a long series of cell divisions, while reproduction requires, on the contrary, a conjugation or union of cells. It has long been supposed that the chief result of fertilization is to stimulate the cell divisions upon which the growth of the new individual depends, and that inbreeding produces defective organisms, because this stimulation is inadequate. Darwin says, for example, that " crossing, by itself, does no good " unless the individuals crossed differ somewhat in characteristics or conditions of growth. Crosses between organisms of a moderate degree of diversity are more vigorous and more fertile than if either of the parent stocks is inbred, but it appears that the limit of fertility is reached much sooner than that of vegetative vigor. This fact corresponds with what has been learned from the microscopical study of cells—that the processes of growth or cell division are much simpler than those involved in reproduction by means of the conjugation of cells. It might be supposed, therefore, that the vegetative vigor of hybrids is the same phenomenon as the vigor of more normal crosses in spite of their reproductive decline.

KINETIC INTERPRETATION OF VIGOR.

It is not possible, however, to content ourselves with this opinion as complete and final, because it does not take into account the vegetative vigor of mutations, or variations here supposed to be induced by inbreeding, which has been thought to weaken the vegetative as well as the reproductive energies of the organism. Viewed from the standpoint of some of the current theories of evolution, the association of the vegetative vigor of mutations with that of normal crosses and hybrids is certainly not obvious, but the difficulty disappears if we view the question from another standpoint and perceive that the additional vigor may be interpreted in both cases as a phenomenon attending vital motion. Evolutionary progress is accomplished both by new variations and by the combination of those already existing.* Normal crosses and abnormal hybrids and mutations may both be thought of as more vigorous than uniform inbred stocks because they have moved into new positions in the field of development. Variation and cross-fertilization serve the same purpose, and under normal conditions of interbreeding both result in increased vigor and prepotency. The important evolutionary function of cross-fertilization is the mutual communication of variations. Continued variation, change, and diversity are the general tendencies, not uniformity and stability of characters. Organisms are not subject to simple inertia, but, like bicycles and gyroscopes, maintain their equilibrium only when in motion.

Plants often receive an increased impetus of growth by removal to new soils, or by changes of the constituents of the soils through what are significantly called "fertilizers." It is also known that they sometimes respond notably to the presence of small quantities of minerals not used by them, or even to those directly injurious, just as arsenic, prussic acid, and other active poisons serve in medicine as tonics. As a result of a similar stimulation of growth by mineral salts applied to the eggs of some of the lower animals, Professor Jacques Loeb was able to induce a parthenogenetic development which was widely reported two or three years ago as "artificial fertilization."

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* "Stages of Vital Motion," Popular Science Monthly, **63**: 14, 1903.

Cross-fertilization and self-fertility, like most terms, are relative. Many plants have been accounted self-fertile because they can propagate without crossing for a few generations. Thus Wallace has suggested that widely distributed plants are self-fertile, the stimulation of new conditions serving, as it were, as a substitute for crossing. This is doubtless true within limits, but should not be taken to mean that complete autogamy is maintained in this manner.* The effects of new substances and new external conditions, while perhaps to be best understood from the evolutionary standpoint, have not the evolutionary significance often ascribed to them, since the increased vigor and other modifications obtained are neither permanent nor hereditary.

Perhaps for lack of a rational explanation of the known benefits of change of descent or of external conditions, both agriculture and medicine are still practiced largely on the theory that there is some particular food, tonic, fertilizer, or climatic treatment which is best for each plant, animal, or disease. When it is appreciated that even the best is best only while it is recent or new, kinetic systems of farming, feeding, and curing may be elaborated, which shall increase agricultural productiveness and human health by properly determined successions or alternations of diets, tonics, climates, or soils. The rotation of crops, the interchange of seed between different regions, the application of fertilizers, and the breeding of new varieties, more vigorous and resistant, are different methods of attaining the same practical results, and the utility of the several expedients may be found to rest on a single biological law.

The vegetative vigor of hybrids and mutations is not a difficulty, then, in a kinetic theory of evolution, but affords a strongly corroborative series of phenomena. The defective reproduction is the abnormal fact, and this appears to be definitely associated with a lack of normal interbreeding. The organism may be prospered in its growth by any change not too violent, and its vigor may be increased even by the degenerative variations which follow upon the absence of normal interbreeding. When thus halted or hindered the vital mechanism but turns aside the further because it has lost the equilibrium of normal motion.

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*Mr. Swingle suggests also that the heteroecism of the parasitic rust-fungi may be a phenomenon of the same kind. The diverse forms which the same rust assumes on its different hosts may be looked upon as a further adaptive substitute for interbreeding.

It is not necessary to regard variation as abnormal, but the variations which appear under narrow inbreeding and wide cross-breeding are abnormal in their amplitude, like fluctuations of temperature in disease. That even completely sterile mutations and hybrids may enjoy exceptional vigor does not change the fact of abnormality, but shows merely that the evolutionary disorder affects the reproductive rather than the vegetative parts. Both in hybrids and in mutations the tendency to sterility sometimes appears so early that the plants do not produce flowers, or there may be a progressive sterilization of the essential organs of the flowers, as in the so-called " doubling " which has appeared independently in so many mutations of cultivated plants. Others may form apparently normal blossoms in profusion, but set no fruits ; fruits may develop without seeds ; seeds may be produced which will not germinate, or seedlings may grow, but never mature. There are all possible stages from normal fertility to complete sterility, as there are endless gradations between normal shape and monstrous deformity.

The present interpretation of the facts has at least the merit of simplicity, since it permits us to suppose that the same evolutionary vigor appears in normal variations and crosses, and in abnormal mutations and hybrids, and that the same evolutionary debility affects the two latter conditions. The vigor is due neither to sterility nor to selection, but to variation ; the sterility is not explained by normal variation, nor by selection, except as selection implies the absence of normal interbreeding, and the consequent weakening of heredity.

Physiology in the narrower sense, the science of nutrition and other bodily functions, does not explain either the vigor or the debility, but in the broader view evolution itself becomes a physiological process, since it affects not merely the form and structure, but determines also the quality and efficiency of the organism, in quite as practical and definite a manner as do food-supply and other external conditions.

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NEW PLANTS FROM NEVADA.

BY AVEN NELSON.

For two or three years past, Mr. F. Beveridge Kennedy, Professor of Botany, Nevada State University, has been very industriously studying the flora of his state. While his attention has been given to its economic aspects in particular, yet the herbarium he is building up must add much to our knowledge of its species. He has very kindly permitted me, from time to time, to study many of these collections. Among the choice things secured there are several numbers that seem to be novelties. Following are the diagnoses as I make out them out. Unless otherwise stated the types are deposited in the Rocky Mountain Herbarium.

Arabis pedicellata sp. nov.

Perennial from a thick woody or sub-fleshy root; the base of the stem also persisting as a caudex; caudex thick (1-2 cm.), leafless but rough with the dense covering of the dead persistent petioles, in length from a mere crown to nearly 1 dm. (according to the age of the plant); stems one or more from the crown, lightly pubescent or nearly glabrous above, stem proper or leaf-bearing portion but slightly surpassing the crown-leaves; leaves canescent with a dense indument of soft stellately branched hairs; those of the crown large and numerous, narrowly oblong or oblanceolate, obtuse or subacute, often 1 dm. long, tapering into a much shorter somewhat margined petiole; those of the stems small, oblong-lanceolate, 2-3 cm. long, sessile by an auricled base; inflorescence naked, at length very open, 10–15 cm. long; pedicels spreading, at length at right angles to the rachis, becoming 3 dm. or more in length; pods similarly spreading, as long as the pedicels, tapering into a beak-like style one fourth as long as the pod, sessile on an enlarged receptacle, flattened parallel to the partition, faintly 1-nerved; sepals oblong, erect, greenish with scarious pink margins, half as long as the petals, the lateral pair noticeably spurred at base, the other pair only slightly gibbous; petals purple, broadly spatulate, with nearly flat blade and cuneately tapered to a short narrow claw; stamens free; stigma small, circular; seeds immature.

The generic position of the plant seems somewhat doubtful. I call it an *Arabis* because of its duration, its branched pubescence, its gibbous sepals, its nearly flat broad petals, its flat 1-nerved pods. But some of these characters are also ascribed to some of the species of *Streptanthus*. In fact this plant has somewhat the appearance of a *Streptanthus* especially in its beaked pods, sessile on an enlarged receptacle. In this respect it reminds one of *S. longirostris* Wats., but one may well question if that species were not better left in *Arabis* where Dr. Watson originally placed it. However, if that species remains a *Streptanthus*, it is possible that the species here described must become *Streptanthus pedicellatus*.

Founded upon Kennedy & True's No. 705, Hunter Creek Canyon (near Reno, Nev.), May 16, 1903.

Viola senecta sp. nov.

Grizzly-white, with rather long, dense, tangled-hirsute pubescence; stems short, slender, from a thickened branched root; leaves ovate, subacute, more or less irregularly toothed, 1-3 cm. long, abruptly or cuneately tapering into the rather long slender nearly glabrous petiole; stipules scarious, mostly entire, linear-lanceolate, somewhat ciliate-pubescent; scapes shorter than the leaves; sepals lanceolate, about 5 mm. long, sparsely ciliate; petals yellow, glabrous, obovate-spatulate, 7-8 mm. long; the lower a little longer, with orbicular blade, abruptly inflexed at base, enclosing two anthers, scarcely at all spurred; connective of anthers produced into a greenish ovate appendage.

This is probably *V. præmorsa* in so far as Nevada specimens cited in literature are concerned. It seems to have characters that demand its separation. The type was collected by Prof. F. H. Hillman, "near Peterson's Ranch", Nev., April 20, 1895,

Mirabilis glutinosa sp. nov.

Stems several from a branched woody caudex, 2-4 dm. high, more or less branched from the base up, somewhat pubescent especially above, the hairs flattened or crinkled and more or less glandular-glutinous; leaves reniform, orbicular or broadly ovate-cordate, obtuse at apex and mostly broadly rounded, 1-3 cm. long, short petioled or the uppermost nearly sessile; involucre campanulate, 5-lobed, 1-flowered, short-peduncled (3-12 mm.); its lobes short-ovate, subacute; pubescence of leaves and flowers similar to that of the stems and peduncles; perianth white, campanulate-funnelform, 10-12 mm. long, its very broad segments cleft into two equal oval lobes; fruit fig-shaped, glabrous, somewhat striate.

This species has usually been considered only a form of *M. californica* Gray. Dr. Coville in his Report upon the Death Valley Expedition (Contrib. Nat. Herb., 4:177) points out the fact that there are two forms which may be distinct. It seems quite probable there are three forms, as there seems to be no good reason for asserting that *M. lævis* (Benth) and *M. californica* are the same. The former came from "Magdalena Bay" and was described as glabrous and as having very unequal involucral bracts. This may well be different from *M. californica* in spite of the fact that it apparently has escaped subsequent collection. It may have happened, too, that the locality at which "H. M. Ship Sulphur" secured the specimens is incorrectly given, as has often happened when large quantities of material are secured in an important expedition.

As to the distinctness of *M. californica* and the species now proposed there can be no question. *M. glutinosa* may at once be known by its subspherical obtuse leaves, its short rather obtuse involucral lobes, and its white flowers. Apparently very few of the flowers ever open but are self-fertilized in the bud. On close examination of the involucre and perianth attention is attracted to the large number of acicular hairs or lines (raphides) in the epidermis both on the outside and inside of these structures.

I take as the type L. N. Goodding's No. 967, from Karshaw, Meadow Valley Wash, Nev., May 27, 1902. Wholly typical are the following: Goodding, No. 778, St. George, Utah; G. H. True, No. 758, Pyramid Lake, Washoe Co., Nev.

Sidalcea crenulata sp. nov.

Perennial from a thick woody root; stems few to several from the crown, nearly simple, more or less decumbent, 3-5 dm. high, green and seemingly glabrous but with some small scattered simple or forked hairs; leaves sparsely appressed pubescent, the hairs simple or forked; the radical orbicular, 2-5 cm. broad, crenulately toothed, the teeth somewhat paired, on petioles 3-5 times as long as the blade; stem leaves more deeply cleft and the uppermost parted into linear divisions; stipules linear, 7-10 mm. long, subglabrous as are also the petioles; raceme slender and at length open; the rachis green, granular-glandular; bracts linear, paired, 5-8 mm. long, pedicels at length equalling the calyx; calyx cleft nearly to the base into lanceolate segments, about 6 mm. long, minutely glandular-pubescent and with occasional longer forked hairs; petals orbicular, emarginate and slightly erose-dentate, 12-15 mm. long, with a short claw; stamineal column rather short; styles not surpassing the anthers; carpels smooth, easily splitting along the dorsal line, deeply notched but not lacerate on the ventral side.

Rather too nearly allied to *S. neo-mexicana* Gray but easily distinguished from it. *S. neo-mexicana* may always be known by its almost hispid hirsuteness which is especially noticeable on the stems, petioles, leaf-veins and calyx. The typical form of this species too is mostly much larger, and often with a single stem from a conical root. It also has a longer stamineal column from which the styles are noticeably exserted.

Mr. Goodding's No. 1091, Juab, Utah, June 10, 1902, is taken as the type. Nearly typical are the following by Prof. Kennedy; No. 673, Simon's Creek, Elko Co., Nev., and No. 811, Stampede, same county.

Sidalcea nervata sp. nov.

Perennial; stems singly from the small woody root, usually somewhat branched above, glabrous below, sparsely and minutely stellate-pubescent above; leaves apparently glabrous but with short forked hairs above and a minute stellate pubescence below, strongly nervosely veined below; the basal long-petioled, orbicular, 6-8 cm. broad, 6-8 lobed, the lobes with 2-3 broad teeth; becoming more deeply divided upwards, the uppermost cleft to the base into linear lobes; stipules narrowly linear: inflorescence densely stellate-pubescent, rather few-flowered; calyx cleft below the middle, the lobes triangular-lanceolate; petals broadly obovate, emarginate, about 2 cm. long, half as broad, pubescent on the short united claws; carpels glabrous, distinctly rugose-reticulated on the dorsal angles, slightly depressed.

A perfectly distinct species allied to *S. oregana* Gray from which its relatively few, much larger flowers will at once distinguish it. It may also be distinguished by its smaller calyx, less acuminate calyx-lobes, short pedicels which are distinctly exceeded by the slender bracts. The inflorescence never presents that crowded spicate appearance of *S. oregana* with its numerous small flowers.

I take as the type my No. 4101, Evanston, Wyo., distributed some years since as *S. oregana.* What seems to be the same is Prof. Kennedy's No. 564, Little Lakes Canyon, Elko Co., Nevada. Somewhat more pubescent and probably showing its variation and distribution are Mr. M. E. Jones's Nos. as follows; 5597, Soldier Summit, Utah, distributed as *S. glaucescens;* 6207, Salubria, Idaho, distributed as *S. campestris.*

Sphæralcea parvifolia sp. nov.

Stems several or many from a rather large woody root, erect, rather slender, only 2-4 dm. high, at first densely stellate-canescent but gradually denuded and becoming bright green with only scattered stellate hairs; leaves small, suborbicular with truncate or subcordate base, 1-2 cm. broad, irregularly crenulate, scarcely lobed, rather thick and slightly rugose, densely stellate-canescent, ultimately more or less denuded and greenish above; the thyrsoid raceme seemingly nearly naked, but the (3-flowered) clusters axillary to the reduced leaves which above are mere bracts; pedicels slender, variable, often longer than the calyx, densely stellate-pubescent as is also the calyx and fruit; calyx about 6 mm. long, cleft below the middle, its lobes triangular-lanceolate: petals rhomboid-obovate, inequilateral with oblique summit, scarcely emarginate, about 12 mm. long; fruit slightly depressed, white with the dense pubescence, only 5 mm. broad and not so high; carpels wholly muticous, the back and rounded dorsal angles subcartilaginous and the sides altogether smooth and membranous, 2-ovuled and often 2-seeded.

This was recently distributed as *S. ambigua* but without any justification it would seem. It is altogether a much smaller plant in every way and the smooth-sided carpels would take it quite out of that section of Gray's revision (Proc. Am. Acad., **22**:292) and of the revision as extended by Dr. Robinson in Syn. Fl. **1**^{1}:315. For equally good reasons it cannot well go into the section with *S. Emoryi* with which it also has some affinities.

Collected by L. N. Goodding at Calientis, Nevada, May 22, 1902, No. 916.

Sphærostigma tortuosa sp. nov.

Perennial from the enlarged crowns of slender rhizomes; stems usually several from the crown, spreading or erect, glabrous, somewhat striate, 1 dm, (more or less) in length, the longer ones inclined to be naked near the base; leaves entire, glabrous, narrowly oblong or linear-oblanceolate, 1-3 cm. long, tapering into a slender petiole about as long as the blade, numerous on the crowns and in the lower portion of the inflorescence; flowers numerous, crowded at the summit of the gradually elongating raceme, usually also some among the crown leaves; calyx tube obconic, about 4 mm. long, equalled by the lanceolate reflexed segments; petals white, broadly obovate, as long as the calyx-lobes; stamens subequal, with oblong anthers, about as long as the petals and the slender style; stigma small, capitate; capsule linear, 1 cm. or more in length, angled with rounded cartilaginous ribs, strikingly contorted and entangled in the leafy raceme and among the leaves of the crown; seeds oblong, obtuse at apex and pointed at base.

This fine species was collected by Prof. P. B. Kennedy at Truckee Pass, Virginia Mts., Washoe Co., Nevada, June 16, 1902.

Phacelia monosperma sp. nov.

Biennial; stem simple, erect, rather stout, 3-4 dm. high, appressed-puberulent with some longer scattered hairs; leaves pinnatifid or those above nearly entire, oblong in outline, petioled, with short matted pubescence and some longer scattered white hairs; inflorescence of nearly straight, slightly divergent secund spikes, softly hispid, and giving the whole plant the appearance of certain *Asperifoliæ;* sepals similar, linear-oblong, in fruit 5-7 mm. long, hispid-ciliate; corolla campanulate, barely as long as the sepals, its rounded lobes shorter than its tube, color in doubt, appendages narrow, somewhat united at the base of the filament; stamens well exserted, the filaments sparsely long-bearded on the exserted portion; the very slender style cleft to the middle; capsule ovate, pointed, somewhat compressed, included; seed solitary (only one maturing), conical-oblong, brown, beautifully retriculate-pitted, 2-3 mm. long, slightly carinate ventrally.

In its solitary seed it resembles *P. platyloba* Gray, which is a somewhat viscid heterosepalous annual; in its pubescence and some other characters *P. hispida* Gray which is a diffusely branched annual.

The type was collected by Prof. F. H. Hillman, June 30, 1893, on Alum Creek in the Sierra foothills.

Mertensia nevadensis sp. nov.

Perfectly glabrous throughout; roots large and ragged, the crown clothed with the brown dead bases of the leafstalks of former years; stems 1-2 dm. high, slender, simple; crown leaves numerous, large for the plant, oblong, obtuse or subacute, 6-8 cm. long, 1-2 cm. broad, on slender petioles nearly as long as the blade; stem leaves smaller, becoming sessile and lanceolate above; inflorescence terminal, crowded; the short pedicels slender; calyx about 4 mm. long, its entire lanceolate segments about 3 mm. long; corolla tubular, its limb but slightly dilated, about 15 mm. long (tube 9 mm.; throat 4 mm.; the obtuse rounded lobes only 2 mm.); stamens equal, inserted on the margin of the throat; the filaments broader than the anthers and about as long; throat-crests conspicuous, tipped with brown, broad and noticeably saccate; corolla tube glabrous within but at the base a ring of 10 very minute paired nectariferous pits, one pair on each of the 10 principal nerves of the tube; style about equalling the stamens.

The only species that this seems comparable with is *M. oblongifolia* Don. but to this it only bears some resemblance in its floral characters. It differs from that species in its large elongated root; its larger (not succulent) leaves; its fewer-flowered more open inflorescence.

Type collected by Messrs. Kennedy and True (No. 711) who report it as common in Hunter Creek Canyon, near Reno, Nevada, May 16, 1903.

Pentstemon violaceus (Brand) Nelson.

Obscurely puberulent throughout; stems several from the scarcely woody branched crown, 1-2 dm. high; leaves oblong or oblanceolate, 2-3 cm. long; the upper sessile, the lower tapering into a slender petiole: thyrsus narrow, obscurely glandular or viscid; calyx short, not more than 2-3 mm. long; the sepals broadly oval or obovate, obtuse but sometimes with a small apiculation; corolla 12-15 mm. long, moderately and gradually dilated, the limb very short and but slightly 2-lipped, its lobes obtuse; anthers horse-shoe shaped, the lower half of the cells remaining closed and saccate, minutely denticulate-ciliate on the margins of the dehiscence; the sterile filament glabrous and not dilated.

Most nearly allied to *P. Roezli* Regel but with broader leaves, narrower inflorescence (not at all paniculate) and very different sepals and corolla. This is very probably *Pentstemon Roezli violaceus* T. S. Brand. I therefore use his varietal name and give the additional description as above.

Secured by Prof. Kennedy at Newcomb Lake, June 8, 1901, No. 15.

Pentstemon Kennedyi sp. nov.

Perennial from a somewhat woody branched root-like caudex, glabrous and inclining to glaucous, 2-4 dm. high; stems mostly simple and singly from the crowns, erect; leaves narrowly oblong or lanceolate; the basal tapering gradually into a slender petiole; the mid-stem sessile by the narrowed base; the upper becoming linear and bract-like; inflorescence narrow; calyx about 1 cm. long; sepals lanceolate, scarious-margined below, the somewhat acuminate upper half tinged with purple; corolla about 3 cm. long, somewhat ventricose, violet-blue (possibly varying to purple); anthers glabrous, dehiscent from base to apex but not confluent, slightly if at all divaricate; sterile filament glabrous and but slightly dilated.

This is one more segregate from the *P. glaber* group, Difficult as it is to say what are valid specific characters, it becomes almost necessary to designate as distinct those forms which the collector and the amateur refuse to unite. On the other hand it seems like folly, in most cases at least, to separate forms upon details which require the compound microscope for detection. A difference that is reasonably constant and sufficiently characteristic to attract the attention of a trained observer in the field cannot well be ignored. Usually, as in this case, less obvious details will be found to confirm the field impressions. In separating this form from *P. glaber* Pursh, it may tend to clearness to recall the following characters of the latter:

Leaves oblong-lanceolate below to ovate-lanceolate above; sepals short, not more than one-sixth as long as the corolla, orbicular-ovate, mostly abruptly short-acuminate, noticeably erose on the scarious sides; anthers more or less short-hirsute; the cells becoming divaricate or explanate: sterile filament dilated, usually somewhat emarginate, stiffly short hirsute near the apex.

The excellent specimens that are taken as the type (No. 736) were collected by Prof. Kennedy at Truckee Pass, Virginia Mts., Washoe Co., Nevada, June 6, 1903.

Lagophylla Hillmani sp. nov.

Annual, about 2 dm. high; stems slender, erect, simple or with a few slender ascending or erect branches, sometimes branched from the base, obscurely granular-glandular pubescent with a few scattered long white hairs; leaves linear, thinly strigose and minutely scabrous; heads terminating naked peduncles, rather large for the genus, 6-8 mm. high; involucre strigose-hispid, some of the hairs tipped with black glands as are also some of those on the peduncles; rays 5-6, light-yellow (?), the lingule broadly oblong, 5-7 mm. long, cleft nearly to the middle into oblong obtuse lobes; disk flowers about 25, apparently all sterile; akene narrowly oblong-obovate, closely enwrapped by the scarious, ciliate-pubescent inflexed base of the involucral bracts, the upper half of which is plane and narrowly lanceolate; bracts between the ray and disk not numerous.

Not very closely allied to any species known to the writer. In aspect intermediate between *Lagophylla* and *Layia* but by reason of the rays, the complete absence of pappus and the abortive disk achenes will have to be considered a species of *Lagophylla.*

Collected by F. H. Hillman, between Truckee and Lake Tahoe, Sept., 1894.

VOL. XVII, PP. 99-100 APRIL 9, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A DECADE OF NEW PLANT NAMES.

BY AVEN NELSON.

Atriplex Serenana.

Atriplex bracteosa S. Watson, Proc. Am. Acad., **9**:115, 1874; not *A. bracteosa* Trautv., Act. Hort. Petrop **1**^{1}:117, 1870.

Atriplex Watsoni.

Atriplex decumbens S. Watson, Proc. Am. Acad., **12**:275, 1877; not *A. decumbens* Roem. & Schult., Syst., **6**:289.

Atriplex pacifica.

Atriplex microcarpa Deitr., Syn. Pl., **5**:536, 1852; not *A. microcarpa* Waldst. & Kit., Pl. Rar. Hung., **3**:278, t. 150, 1812.

Atriplex matamorencis.

Atriplex oppositifolia S. Watson, Proc. Am. Acad., **9**:118, 1874; not *A. oppositifolia* D. C., Rapp., **1**:12, nor *A. oppositifolia* Will., Prosp., 21. Exact dates not at hand but both publications earlier than Watson's. Besides these there is *A. patula oppositifolia* Moq., Enum. Chenopod. 54, 1840.

Atriplex joaquinana.

Atriplex spicata S. Watson, Proc. Am. Acad., **9**:108, 1874; not *A. spicata* Stokes, Bot. Mat. Med., **2**:24, 1812.

Viola Kelloggii.

Viola purpurea Kellogg, Proc. Cal. Acad. (II) **1**:55, 1873; not *V. purpurea* Stev., Bull. Soc. Nat. Mosc., **29**:310, 1856.

Castilleja exilis.

Castilleja stricta Rydb., Mem. N. Y. Bot. Gard., **1**:354, 1900; not *C. stricta* D. C., Prodr., **10**:534, 1846.

Pentstemon formosus.

Pentstemon pulchellus Greene, Pitt, **3**:310, 1898; not *P. pulchellus* Lindl. Bot. Reg. t. 1138.

Pentstemon superbus.

Pentstemon puniceus A. Gray, Torr. Bot. Mex. Bound., 113, 1859; not *P. puniceus* Lilja., Linnæa, **17**:111, 1843.

Pedicularis Grayi.

P. procera Gray, Am. Jour. Sci. (II) **34**:251, 1862; not *P. procera* Adams, ex. Stev. in Mem. Soc. Nat. Mosc., **6**:33, 1823.

VOL. XVII, PP. 101-102 APRIL 9, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

GENERAL NOTES.

SONORELLA WOLCOTTIANA—A CORRECTION.

Owing to an oversight in proof reading of the description of *Sonorella walcottiana*, Proc. Biol. Soc. Wash., Vol. XVI, pp. 103-104, June 25, 1903, the name appeared as above. The species was named in honor of Mrs. H. L. T. Wollcott, the collector, and the name should read *Sonorella wolcottiana.—Paul Bartsch.*

THE SPECIES OF GEUM OCCURRING NEAR WASHINGTON.

Four species of *Geum* are said by Ward (Bull. U. S. National Museum, No. 22, p. 77, April 20, 1882) to occur in the neighborhood of Washington: *G. album*, *G. virginianum*, *G. strictum*, and *G. vernum*. The third of these proves to have been incorrectly recorded, as the specimen labeled *Geum strictum* in the Ward herbarium is unquestionably *G. virginianum*. Moreover, the locality where it was collected, Hunting Creek, Fairfax Co., Virginia, with which I am thoroughly familiar, is not a place where the northern plant, if found in this region at all, would be likely to occur. The number of species in the local flora will, however, remain unchanged, as *Geum flavum*, though not hitherto recorded, is common in Fairfax County. According to my observations, during the past two summers, it seldom if ever grows in the damp, heavily shaded locations often frequented by *G. canadense*, and never in the half-boggy thickets preferred by *G. virginianum*, but usually occurs in open dry woods.—*Gerrit S. Miller, Jr.*

SPELERPES PORPHYRITICUS IN NEW HAMPSHIRE.

Mr. Edward S. Wilson caught in a cold mountain brook at Bridgewater, N. H., in June, 1902, a specimen of this species. The brook empties into Lake Pesquaney (New found lake), and where the animal was caught is about seven hundred feet above sea level. I am not aware that this species has been taken as far north. The specimen is now in the collection of Camp Pesquaney, Bridgwater, N. H., and was identified by Dr. Samuel Garman.—*Reginald Heber Howe, Jr.*

NANNORCHILUS, NEW NAME FOR HEMIURA, PREOCCUPIED.

In 1888, finding that *Uropsila* as used for a genus of Troglodytidæ was preoccupied, I proposed the name *Hemiura* as a substitute. This proves also to have been used previously, so it becomes necessary to replace it by another. The synonymy of the genus, to date, is follows.

Nannorchilus Ridgway.

Uropsila (not *Uropsilus* Edwards, 1872) Sclater and Salvin, Nom. Av. Neotr., 1873, 155. (Type, *Troglodytes leucogastra* Gould.)

Hemiura (not *Hemiurus* Rudolphi, 1809, nor Gervais, 1855) Ridgway, Proc. U. S. Nat. Mus., X, Aug. 6, 1888, 511. (Substitute for *Uropsila* Sclater and Salvin, preoccupied.)

*Nannorchilus** Ridgway, nom. nov. (Type, *Troglodytes leucogastra* Gould.)
—*Robert Ridgway.*

A PREOCCUPIED CRAB NAME.

The name *Melia* used by Latreille in 1825, for a genus of crabs (Encyc. Méth., X, 705), is preoccupied by *Melia* Billberg, 1820, a genus of amphipods (Enum. Insect.). I am obliged to Dr. Walter Faxon for verifying this reference. Latreille's genus, which has for type the curious anemone-grasping species, *M. tesselata* (Latr.), may be known as *Lybia*, a name used by Milne Edwards in 1834 (Hist. Nat. Crust., I, 431) before he was aware of Latreille's genus.—*Mary J. Rathbun.*

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*Νάννος, dwarf; ὀρχίλος, a wren.

VOL. XVII, PP. 103-110 MAY 18, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF SEVEN NEW RABBITS FROM MEXICO.

BY E. W. NELSON.

The Biological Survey Collection contains several hundred specimens of rabbits from Mexico, including representatives of all the species known to occur in that country, outside of Lower California. Recent examination of this material shows that in addition to the known species it contains the two strongly marked new species and five new subspecies which are described below. I am indebted to Dr. C. Hart Merriam, Chief of the Biological Survey, for the opportunity to study this material, and to Mr. Vernon Bailey for suggestions regarding the species found along the boundary line, with which recent study has made him familiar. I am also under obligations to Mr. Gerrit S. Miller, Jr., Assistant Curator of Mammals, U. S. National Museum, to Dr. J. A. Allen, of the American Museum of Natural History, and to Mr. Outram Bangs, of the Museum of Comparative Zoology, for the use of material from the collections in their charge for comparison.

Subgenus **Sylvilagus** Gray.

Lepus insonus sp. nov.

OMILTEME RABBIT.

Type.—Adult female, No. 126,878, U. S. National Museum, Biological Survey Collection, from Omilteme, Guerrero. Collected May 20, 1903, by E. W. Nelson and E. A. Goldman. Original number 16,466.

Distribution.—Known only from type locality.

General characters.—A dark, coarse-haired species with small short tail belonging to same group as *Lepus gabbi* and *L. truei*, but considerably larger, with ears twice as large as in either of species named.

Description of type in spring pelage.—Top of head and back dark ochraceous buffy, approaching tawny ochraceous, heavily shaded and grizzled with black; cheeks and sides of body and rump a little paler and grayer than back; sides of nose and area about eyes dingy buffy grayish; nape dull dingy rusty rufous; top of tail dull dark reddish brown; under side of tail dingy brownish buffy; neck on sides and below dull dark buffy; rest of under parts white with bluish under fur showing through; tops of fore feet and under side of fore legs dingy whitish; front and sides of fore legs to shoulders tawny ochraceous; front of hind legs and tops of feet dingy whitish; rest of hind legs similar to sides but with a tawny ochraceous wash becoming most marked about heels and sides of hind feet; soles of feet dark smoke brown; ears on convex surface dark grizzled blackish brown, a little more blackish along anterior border and at tip.

Skull characters.—Skull practically indistinguishable from that of *L. truei*, but apparently with slightly shorter, heavier jugal.

Measurements.—External measurements of type (taken in flesh): Total length, 430; tail vertebræ, 40; hind foot, 93; ear from notch (from dried skin), 62.

Cranial measurements of type: Occipito-nasal length, 75; basal length of Hensel, 57; interorbital breadth, 17.5; parietal breadth, 26; length of nasals, 31.5; breadth of rostrum above front of base of premolar, 17; depth of rostrum at same point, 15; greatest diameter of bullæ, 9.

Specimens examined.—Two.

General notes.—Though obviously belonging in the same group as *L. truei* and *L. gabbi*, the curiously dark color and strikingly larger ears at once distinguish the present species. The skull is decidedly larger than that of *L. gabbi*, but is practically indistinguishable from that of *L. truei*. Like *truei*, the present well-marked species lives in burrows in heavy forest, and is very difficult to secure, owing to its mainly nocturnal habits and the heavy undergrowth in its haunts.

Lepus veræcrucis pacificus subsp. nov.

ACAPULCO COTTONTAIL.

Type.—Adult male, No. 70,622, U. S. National Museum, Biological Survey Collection, from Acapulco, Guerrero. Collected January 9, 1895, by E. W. Nelson and E. A. Goldman. Original number 7340.

Distribution.—Pacific Coast region of Guerrero and adjacent section of Oaxaca.

General characters.—Externally much like typical *veræcrucis*, but paler and more buffy. Skull larger and more massive; rostrum, especially, deeper and heavier.

Description of type in unworn winter pelage.—Upper parts, including top and sides of head, back and sides of body, dingy creamy buff washed and grizzled by overlying black on tips of long hairs, the black wash heaviest on middle of back and palest on sides of body; top of tail dull rusty clay color; nape rusty rufous; front of forelegs and feet dingy buffy shading back into dull rusty buffy on sides of legs; hind legs like flanks on outside of thighs, but shading back into dingy rusty buffy; line along front of hind leg and top of foot white; neck on sides and below deep buffy; rest of under parts white except for a dingy buffy line on inguinal region; ears grizzled grayish brown on base, gradually darkening to narrow black tips on inner or convex surface.

Skull characters.—Skull similar in general character to that of typical *veræcrucis* but larger and more massive; rostrum much deeper and heavier in proportion; braincase narrower, more depressed and less abruptly descending on posterior outline; nasals nearly as broad anteriorly as at base; depth of rostrum from anterior base of molars nearly equals width above same point; jugals very heavy, with a deep groove ending anteriorly in a deep pit; bullæ about same size as in true *veræcrucis* but proportionately smaller.

Measurements.—External measurements of type (taken in flesh): Total length, 505; tail vertebræ, 58; hind foot, 113; ear from notch (from dried skin), 78.

Cranial measurements of type: Occipito-nasal length, 86; basal length of Hensel, 65; interorbital width, 19.5; parietal width, 26.5; length of nasals, 39; width of nasals at base, 16.5; width of nasals near tip, 13; depth of rostrum at anterior base of molars, 20; width of rostrum above same point, 19.5; greatest diameter of bullæ, 11.

General notes.—This is slightly larger than true *Lepus veræcrucis*, which ranges across all the intervening country between the eastern border of the tableland and the range of the present form. Specimens from interior Guerrero are referable to the typical form, with its smaller, lighter skull. Considering the climatic and other physiographic differences between the home of typical *veræcrucis* and the present form, there is surprisingly little difference in color.

Lepus floridanus connectens subsp. nov.

ALTA MIRA COTTONTAIL.

Type.—Adult male, No. 63,660, U. S. National Museum, Biological Survey Collection, from Chichicaxtle, Vera Cruz. Collected February 15, 1894, by E. W. Nelson and E. A. Goldman. Original number 5849.

Distribution.—Tropical parts of eastern Mexico from southern Tamaulipas throughout the coast lowlands to the Papaloapam River in central Vera Cruz and along the east slope of the Cordillera of eastern San Luis Potosi, eastern Puebla, and eastern Oaxaca south to Mt. Zempoaltepec.

General characters.—Externally much like typical *L. floridanus*, but larger and pelage averaging a little paler. Skull longer, proportionately narrower; bullæ smaller; nasals longer and slenderer. Ears large.

Description of type in faded winter pelage.—Top of head and back grizzled creamy ochraceous buffy, thinly washed with blackish by black tips to longer hairs; sides of head, body, and rump distinctly grayer and less buffy; top of tail dull reddish brown; nape bright rusty or light cinnamon-rufous; circumorbital area white; neck on sides and below dull ochraceous buffy; front of fore legs and outside of hind legs cinnamon rufous; back of fore legs and front of hind legs and top of hind feet white with a pale buffy suffusion on feet and toes; ears narrowly edged with white; convex surface brownish gray on base gradually darkening to brownish black toward tip.

Skull characters.—Longer and proportionately narrower than in true *floridanus;* rostrum long with height equaling width at base; nasals long, proportionately narrow and depressed at tip, giving upper surface of rostrum a gently convex outline; braincase rather narrow and drawn out, giving a more gently curving outline posteriorly than in typical *floridanus;* jugal with a strong groove ending anteriorly in a well-marked pit; bullæ smaller than in true *floridanus* but larger than in *aztecus;* general outline of skull above less strongly convex than in *floridanus* and more as in *aztecus* and *russatus.*

Measurements.—External measurements of type (taken in flesh): Total length, 442; tail vertebræ, 63; hind foot, 97; ear from notch (from skin), 63.

Cranial measurements of type: Occipito-nasal length, 76; basal length of Hensel, 57; interorbital width, 18; parietal width, 26; length of nasals, 35; width of nasals at base, 16; greatest diameter of bullæ, 10.

Specimens examined.—Forty-one.

General notes.—Specimens in midsummer pelage from the humid basal mountain slopes near Jalapa, Vera Cruz, and elsewhere differ but little in color from typical *floridanus* at the same season; the legs are a little browner and less reddish, and the head is more grayish; the ears are nearly the same in size and color. Such specimens can only be distinguished by size and skull characters. From *chapmani* their much larger size, darker colors, and the much larger and heavier skull readily distinguish them. From *russatus*, the nearest relative on the south, they may be known by their paler colors, much larger ears, and broader and heavier skull. Specimens from the humid mountain slopes at Metlaltoyuca (Puebla), Jico, near Jalapa (Vera Cruz), and Mt. Zempoaltepec (Oaxaca) average rather larger and darker than those from the coast lowlands, but the difference is too slight and inconstant to warrant more than passing mention. Specimens from Mt. Zempoaltepec are intergrades between *connectens* and *russatus*, with ears approaching the latter, but their skull characters place them with the former.

Lepus floridanus chiapensis subsp. nov.

CHIAPAS COTTONTAIL.

Type.—Adult female, No. 75,953, U. S. National Museum, Biological Survey Collection, from San Cristobal, Chiapas. Collected September 28, 1895, by E. W. Nelson and E. A. Goldman. Original number 8483.

Distribution.—Interior of Chiapas and western Guatemala, from not over 2,500 feet above sea level up to the summits of the highlands at over 10,000 feet.

General characters.—Similar to *L. floridanus aztecus*, but larger and a little darker, with rufous on legs of a duller and darker shade. Skull larger, with rostrum strikingly broader and more depressed at tip.

Description of type in fresh winter pelage.—Top of head and back dark grizzled ochraceous buffy (with a slight reddish tinge) overlaid with a thin blackish wash due to black tips of long hairs; sides and rump distinctly more grayish, lacking most of the reddish buffy of back; nape rusty rufous, darker posteriorly; upper side of tail dark reddish brown, becoming blackish about tip; front and sides of fore legs cinnamon rufous; back and sides of hind legs reddish chestnut; back of fore legs and front of hind legs and top of hind feet deep reddish buffy; under side of body mainly deep yellowish buffy (some other specimens have ventral surface white); sides of head with small buffy whitish spots back of and just in front of eyes; rest of sides of head similar but a little paler than reddish buffy crown; ears with fine pale border on inner side; externally (on convex surface) blackish brown from grizzled grayish brown base to tip.

Skull characters.—Skull large and heavy; longer than in *aztecus* and about the same length as in *yucatanicus* but not so massive as in that form; rostrum very broad, especially at outer end, but depth of rostrum proportionately small; outer end of nasals broad and much less depressed than in *aztecus*, thus adding to massive appearance of rostrum viewed from above; superior outline of skull posteriorly gently curved, about as in *aztecus*, but much straighter and more flattened anteriorly; interorbital width narrow; jugal heavy, with a well-marked groove ending anteriorly in a deep pit; bullæ about same size as in *aztecus* but proportionately smaller.

Measurements.—External measurements of type (taken in flesh): Total length, 468; tail vertebræ, 55; hind foot, 97; ear from notch (from dried skin), 60.

Cranial measurements of type: Occipito-nasal length, 80; basal length of Hensel, 61; interorbital width, 18; parietal width, 26; length of nasals, 37; width of nasals, 17; depth of rostrum at front base of molars, 15; width of rostrum above same point, 19; greatest diameter of bullæ, 10.

Specimens examined.—Eleven.

General notes.—With the exception of being a little darker colored, especially the rufous on the legs, and its larger size, the Chiapas cottontail bears externally a close resemblance to *L. f. aztecus*, but its well-marked skull characters are sufficient to distinguish the two. The broad flat rostrum is a strong character which is very distinctive. So far as known, this is the southernmost subspecies of *Lepus floridanus*. In general size the skull of *chiapensis* is nearest that of *yucatanicus*, but the broader, flatter rostrum, narrower braincase, and smaller bullæ distinguish it.

Lepus arizonæ goldmani subsp. nov.

SINALOA COTTONTAIL.

Type.—Adult male, No. 96,812, U. S. National Museum, Biological Survey Collection, from Culiacan, Sinaloa, Mexico. Collected March 20, 1899, by E. A. Goldman. Original number 13,588.

Distribution.—Southern part of Sonora (from the Rio Yaqui) south at least to Culiacan, central Sinaloa.

General characters.—Darker and more richly colored than typical *arizonæ*, with the white and rufous areas on legs sharply contrasting. Bullæ much smaller.

Description of type in winter pelage.—Top of head and back creamy ochraceous-buff grizzled and washed with black; sides of head and body slightly paler, more pinkish buffy, with much less overlying black; small area on rump distinctly iron gray with scarcely a trace of buffy; nape rusty rufous; top of tail dark brown grizzled with dull buffy; neck, on sides and below, pinkish buff; rest of under parts clear white; front and sides of fore legs rusty ochraceous buff, becoming paler on front of legs and top of feet; back of fore legs clear white; sides and back of lower part of hind legs and feet a little darker and more rusty rufous than fore legs; line along front of hind legs and top of feet white, sharply outlined, as on fore legs, by rufous; inside of ears dingy gray; outside or convex surface finely grizzled grayish, buffy brown shading into a narrow blackish border about tips.

Skull characters.—Skull generally similar to that of typical *arizonæ*, but with rostrum broader and more inflated, or less tapering anteriorly and decidedly smaller bullæ, which in shape and proportion to skull resemble those of the *floridanus* group.

Measurements.—External measurements of type (taken in flesh): Total length, 388; tail vertebræ, 56; hind foot, 87; ear from notch (from dried skin), 66.

Cranial measurements of type: Occipito-nasal length, 66; basal length of Hensel, 52; interorbital breadth, 17; parietal breadth, 24; length of nasals, 27; greatest diameter of bullæ, 11.

Specimens examined.—Fifteen.

Subgenus **Macrotolagus** Mearns.

Lepus festinus sp. nov.

HIDALGO JACK RABBIT.

Type No. 53,490, adult male, U. S. National Museum, Biological Survey Collection. From Irolo, Hidalgo, Mexico. Collected March 31, 1893, by E. W. Nelson and E. A. Goldman. Original number 4522.

Geographic distribution.—Southeastern part of Mexican tableland in southern and eastern Queretaro, throughout most of Hidalgo, extreme northern part of State of Mexico (including valley of Mexico), Tlaxcala and adjacent part of northern Puebla.

Specific characters.—In general appearance much like *L. merriami* but darker, with much larger ears, the latter with a large, well-marked black spot at tip on convex side; nape gray, paler than back; skull smaller and lighter than in *merriami*.

Description of type in winter pelage.—Top of head dingy grizzled buffy; back buffy with a slight tinge of dull reddish brown, heavily mottled and grizzled with black; sides of body paler and grayer; thighs and rump up to median line iron gray; a heavy black band divides the gray of rump along median line and covers top of tail; under side of tail dingy gray; sides of head and neck dull buffy, palest on cheeks and darker with a slight tinge of vinaceous on sides of neck; under side of neck deep dull buffy; chin and under side of body white; top of hind feet dingy white becoming grayish on toes; top of fore legs dingy buffy thinly grizzled with blackish; ears finely grizzled yellowish gray on front half of convex surface, and fringed with slightly yellowish white hairs on anterior edge; posterior half of convex surface white, with a distinct black spot covering 35 mm. of the tip and extending a dusky edge around border of anterior part of tip; nape grizzled grayish without a trace of black patch characteristic of *L. merriami.*

Skull characters.—Skull lighter and rather smaller than that of *L. merriami*, and practically indistinguishable from that of *L. texianus* from Chihuahua and the Texas boundary.

Measurements of type (taken in flesh).—Total length, 575; tail vertebræ, 78; hind foot, 126; ear from notch (from dried skin), 138.

Measurements of type skull.—Occipito-nasal length, 96.5; basal length, 74; length of nasals, 43; greatest interorbital breadth, 26.5; parietal breadth, 31; depth of rostrum at front base of premolars, 25; width of rostrum above same point, 20; greatest diameter of bullæ, 14.

Specimens examined.—Nine.

General notes.—This species is apparently most closely related to *L. merriami asellus*, from which its even larger ears and entire absence of black patch on nape at once distinguish it. The nape is much like that of *L. texianus*, and the skull is a little smaller and lighter than that of *merriami* and scarcely distinguishable from that of *texianus.* The color of back and general appearance of this animal is that of a dark-colored *L. merriami* with extraordinarily large ears and no black nape patch. Its habitat is at the southern border of that of *L. m. asellus* and widely separated from that of *L. texianus.*

Lepus merriami altamiræ subsp. nov.

ALTA MIRA JACK RABBIT.

Type No. 93,691, adult male, U. S. National Museum, Biological Survey Collection. From Alta Mira, Tamaulipas, Mexico. Collected May 16, 1898, by E. W. Nelson and E. A. Goldman. Original number 12,365.

Geographic distribution.—Coastal plains in southern part of Tamaulipas, extreme northern Vera Cruz, and eastern San Luis Potosi.

Zonal distribution.—Arid tropical.

Subspecific characters.—Similar to typical *merriami* in color, but under side of neck deeper and clearer buffy, and black nape patch distinctly separated into two parallel black stripes by a well-defined median band of yellowish often equalling black bands in width; skull larger and heavier, with longer rostrum than in *L. merriami.*

Description of type in rather worn spring pelage.—Top of head grizzled grayish buffy; back dull creamy buffy grizzled and mottled with overlying black tips to hairs; sides of body slightly paler buffy grizzled with grayish; thighs and sides of rump up nearly to median line of back rather pale iron gray; top of fore feet and legs dingy buffy; top of hind feet white; top of tail and narrow line extending forward along middle of rump black; under side of tail grayish white; sides of head, with sides and under part of neck, bright buff, with some black grizzling on sides of head; nape with a narrow black band extending back from base of each ear with a median band of buffy of equal width separating the two black bands; ear on front half of convex surface grizzled yellowish buffy and bordered along edge by a fringe of buffy hairs; posterior half of convex surface blackish at base and shading into grayish white on middle and pure white on terminal part, which lacks any sign of a black margin or tip; posterior border of ear buffy on basal half; white along rest of margin (pure on convex side, shaded with buffy on concave side) to near tip, which is buffy.

Skull characters.—Skull much as in typical *L. merriami*, but longer and rather heavier, with longer and heavier rostrum.

Measurements of type (taken in flesh).—Total length, 605; tail vertebræ, 96; hind foot, 137; ear from notch (from dried skin), 112.

Measurements of type skull.—Occipito-nasal length, 99; basal length, 77; length of nasals, 44; greatest interorbital breadth, 24; parietal breadth, 32; depth of rostrum at front base of premolar, 26; width above same point, 26; greatest diameter of bullæ, 12.

Specimens examined.—Six.

General notes.—This form agrees with typical *L. merriami* in general appearance, but in five out of six specimens examined the black nape patch is divided by a distinct yellow band. The under side of the neck is much deeper buffy, and the tips of the ears on the convex side entirely lack any trace of black in three specimens and have only a narrow black edging in the three others examined. The larger skull with longer, heavier rostrum is another character. It has a comparatively limited distribution, and occupies the southernmost area occupied by the species along the Gulf coast of Mexico, and probably does not range as far north as Victoria, Tamaulipas.

VOL. XVII, PP. 111-112. MAY 18, 1904.

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON TETRANEURIS LINEARIFOLIA.

BY T. D. A. COCKERELL.

Tetraneuris linearifolia (Hooker) Greene.

This species is certainly very variable, both as to its mode of growth and the width of the leaves. How far these differences are racial it is hard to say. The specimens seen are as follows:

Texas.—Kerrville, Kerr Co. (Heller); "Texas" (Lindheimer, 267); "On the Pierdenales" (Lindheimer); Leona (Wright); "Pecos, etc." (Wright); Brazos (Lindheimer); Dallas (Elihu Hall); near New Braunfels (Lindheimer); Gillespie Co. (G. Jermy); Dallas (Reverchon); San Antonio (E. H. Wilkinson); Dallas (B. F. Bush). The Lindheimer plants have very narrow leaves, and are no doubt typical. The Heller plant from Kerrville (Heller, 1619; hb. Mo. Botanical Garden) has larger heads (over 25 mm. diam. with rays, and about 12 without), dark olive-green almost entirely glabrous foliage, some of the leaves as much as 5 mm. broad, and strongly striate practically glabrous stems. The involucres and peduncles beneath are covered with ochreous hair. The plant has a spreading bushy growth, and is about 25 cm. high, counting the heads. This plant grows in "rich and often shaded ground" (Heller, Bot. Expl. So. Tex., p. 109), whereas Lindheimer's plant grows "in masses together on sandy prairies, with thin soil" (Lindheimer, 648). Whether the Kerrville plant represents a "form" or a true race, can not be certainly determined at present, but the latter would seem rather probable, or Heller would have found both states. It may be called var. *latior* (type, Heller's 1619).

Oklahoma.—Huntsville, Kingfisher Co. (Laura A. Blankinship). Small plants; lowest leaves broad.

Kansas.—Sumner Co. (Mark White). Bushy; leaves narrow.

Tetraneuris linearifolia oblongifolia (Greene)

Tetraneuris oblongifolia, Greene, Pittonia, iii, 269. (1898.)

I have before me Palmer's No. 677, from the State of Nuevo Leon. The heads are about 10 mm. broad (excl. rays), the rays large and broad; the leaves are up to about 3½ mm. broad, and quite hairy; the achenes, pappus, etc., are as in *linearifolia*. I do not think this can well rank as a species.

Tetraneuris linearifolia dodgei subsp. nov.

About 25 cm. high, with several stems; very hairy, the young leaves enveloped in loose tomentum; heads (excl. rays) about 13 mm. broad; *radical leaves pinnatifid with broad lateral lobes* diverging at right angles from the rather broad blade; cauline leaves short and mostly quite narrow; aristæ of pappus longer than in *linearifolia* or *oblongifolia*. Monterey, Mexico, "in fields, very common," May, 1891. (Chas. K. Dodge, 109; U. S. N. M., 27,471.) The heads on long upright peduncles look like those of *oblongifolia*, but the foliage is quite different. This ought perhaps to be regarded as a valid species, but I expect that intermediates between it and *linearifolia* will be found.

VOL. XVII, PP. 113-114 MAY 18, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW SUBSPECIES OF TROPICAL AMERICAN TYRANT BIRDS.

BY OUTRAM BANGS.

Of the two tyrant birds here named as new subspecies, one is a well-marked form of *Serphophaga cinerea* (Strickl.) from the Santa Marta region of Colombia, formerly referred by me to *S. cinerea grisea* Lawr. The other is the extreme northern form of the wide ranging *Todirostrum cinereum* (Linn.), from southern Mexico. Fortunately the type locality of *T. cinereum*—Surinam—is well toward the southern end of the range of the species, and extreme northern and southern specimens when compared together are different enough. A long chain of intergrades, however, through Central America and Panama completely connects the two extreme races and it is no easy matter to say which name many of these should bear. Roughly speaking, specimens from Honduras north may be referred to the northern form and those from Panama south to the southern.

Serphophaga cinerea cana subsp. nov.

Type from Chirua, Sierra Nevada de Santa Marta, Colombia, 7000 feet altitude, adult male No. 6125, coll. of E. A. & O. Bangs, collected March 17, 1899, by W. W. Brown, Jr.

Characters.—Most like *S. cinerea grisea*, but head dull brownish-black, with very large and conspicuous semi-concealed patch of white on crown; back very pale smoke gray; under parts nearly uniform grayish white—

the breast and sides but little grayer than the throat and belly; wing bars and edging of tertials much paler gray-whitish.

S. cinerea grisea of Costa Rica and Chiriqui has the head deep black, the white patch on crown small, the back cinereous almost without brownish tinge, the breast and sides dark gray—much darker than the throat and belly—and the wing bars and edging of tertials dark gray.

S. cinerea cinerea from Peru and eastern Ecuador (type locality supposed to be Chili) has the back much browner and slightly darker gray, and the under parts much grayer.

MEASUREMENTS.

No.	Sex.		Wing.	Tail.	Tarsus.	Exposed culmen.
6125	♂ ad.	Chirua, 7000 feet	56.	43.	16.6	10.2
6127	♂ ad.	La Concepcion, 3000 feet.	55.5	40.5	16.8	9.8
6128	♀ ad.	" " " "	50.	39.5	16.2	9.6
6126	♀ ad.	San Miguel, 7500 feet. *	51.	41.	16.4	——

* All these places are in the Sierra Nevada de Santa Marta, Colombia.

Todirostrum cinereum finitimum subsp. nov.

Type from San Juan Bautista, Tabasco, Mexico, adult male No. 4148, coll. of E. A. & O. Bangs, collected March 7, 1890.

Characters.—Similar to true *T. cinereum* of Guiana and southeastern Brazil, except in being darker yellow below, lemon yellow or canary yellow instead of sulphur yellow, and much darker above—the back dull, dark olive-green with faint dusky striations, lacking the grayish or cinereous tinge of these parts in true *T. cinereum;* in the new form there is gray only on the nape where the black of the cap fades into the green of the back and here the gray is much darker than in true *T. cinereum.*

MEASUREMENTS.

No.	Sex.		Wing.	Tail.	Tarsus.	Exposed culmen.
4148	♂ ad.	Type	41.	32.	18.4	13.8
4147	♂ ad.	Topotype	41.	31.	18.2	——
4149	♀ ad.	"	40.5	31.5	18.	13.6

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

ADDITIONS TO THE ORCHID FLORA OF FLORIDA.

BY OAKES AMES.

The orchid floras of peninsular Florida and of the West Indies are so similar in the genera and species common to both that it is not surprising to find, among recent additions to the list of Florida orchids, species known to be natives of Cuba, Porto Rico, and Jamaica. During November and December, 1903, six genera new to Florida, including seven species, were discovered by a single collector in Dade County. Most of these were found in abundance and, as careful comparisons showed, were identical with genera and species known to come from Cuba and Jamaica. One species proved new to science, but in February, 1904, was discovered by myself in the Province of Pinar del Rio, near the town of Artemisa, forty miles west of Havana. In March, 1904, while on the west coast of Florida about eighty miles from the end of the Peninsula, I found among other orchids three species up to that time unrecorded from the United States, one of them belonging to a genus new to Florida. Of all of them I had collected specimens previously in different parts of Cuba, one frequently in Pinar del Rio province. At the present time, with the exception of *Epidendrum tampense* Lindl. and *E. conopseum* R. Br., there is no epiphytic orchid known to occur in Florida which has not also been reported from Cuba and other parts of Tropical America, while the same may be said of many of the terrestrial species; a fact which shows quite plainly that the West Indies must be reckoned with to a large extent in the study of our semi-tropical orchid flora.

The following list contains six species hitherto unrecorded as natives of the United States. Two of them, however, on account of inadequate material are here reported on provisional, though reasonably sure, determinations. One, *Liparis elata*, was received in 1903 from Lee County, Florida, where it was collected by the late James E. Layne. No data accompanied the specimens, which were in a fresh state, one of them pushing up a flower shoot that failed to reach maturity. The other species, *Pelexia setacea*, was collected by Mr. A. A. Eaton in Dade County. When received, Mr. Eaton's plants were partly frozen so that the flowers ceased developing. From the buds, however, analyses were made that showed characters on which the following determination is based. Of the remaining species, three were collected by me on the west coast of Florida and one by Mr. Eaton near Miami, on the east coast.

Ionopsis utricularioides Lindl.

On low trees near pools of water. Found only in "Gobbler's Head," near Naples, Lee County, the flowers just opening. March 12 (*O. A.*).

Epidendrum strobiliferum Rchb. f.

On the lower limbs of *Persea carolinensis* Nees., in "Palm Hammock," near Marco. Only one station; the plants in fruit. March 19 (*O. A.*).

Epidendrum anceps Jacq.

Common on deciduous trees, almost everywhere, not infrequently forming the main epiphytic orchid flora round muddy "lakes" in cypress swamps; Lee County, March 15–21 (*O. A.*).

Pelexia setacea Lindl.

In humus, in the dense shade of hammocks, fourteen miles south of Cutler, Dade County, Dec. 10, 1903 (*A. A. Eaton*). My specimens agree perfectly with *P. setacea*, except for the spur, but the immaturity of my material may well account for discrepancies in this respect, as the spur must lengthen considerably as the flower develops.

Liparis elata Rchb. f.

Lee County, July, 1903 (*J. E. Layne*).

Sauroglossum cranichoides n. comb.

(*Pelexia cranichoides* Grisebach, Cat. Plant. Cubensium, 1866, p. 269; *Spiranthes storeri* Chapman, Flora of the Southern United States, 1897, p. 488; *Beadlea storeri* Small, Flora of the Southeastern United States, 1903, p. 319.)—In humus in the deep shade of Breckell Hammock, near Miami, Dade County, Dec. 23–28, 1903 (*A. A. Eaton*). This is undoubtedly the species described by A. W. Chapman as *Spiranthes storeri* in 1897, and later placed by Dr. J. K. Small in a new genus as *Beadlea storeri*. Tracings of the floral organs and of the plant, taken from the type material of *Beadlea* in the herbarium of the New York Botanical Gardens, agree perfectly with the specimens collected by Mr. Eaton and with *Pelexia cranichoides* Grisebach. Dr. Small described *Beadlea* as without callosities at the base of the lip, but this was an oversight, as later investigations showed the presence of two callosities, much the same as in *Spiranthes*. In referring the species in question to *Pelexia*, A. H. R. Grisebach must have interpreted the characters of that genus rather loosely, as the flowers on the plants which he described lack the characteristic spur of *Pelexia* and do not agree with it in several other important respects. The nearest affinity of *Sauroglossum cranichoides* seems to be *S. elatum* (Rich.). From both species *Sauroglossum elatum* Lindl. is distinct, so that it seems best to revive the first specific name of this plant, which would eliminate the likelihood of confusion and give as a new combination *Sauroglossum nitidum* (Vell).

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THREE NEW ORCHID SPECIES.

BY OAKES AMES.

The three species of orchidaceous plants described below have been for some time the cause of much perplexity, as I have been unable to refer them to species hitherto published. The *Dendrobium* was given to me by Mr. F. Sander, of St. Albans, England, who received it from New Guinea, where it was collected by Micholitz. The only information concerning the specimen referred to the color of the flowers and to the probability of there being a variety characterized by "purple" veins on the perianth. The two *Epidendrums* were collected in Mexico by Mr. C. G. Pringle and are interesting additions to a complex genus. To Mr. R. A. Rolfe, who kindly examined the specimens and on finding them worthy of specific rank described them, I owe my best thanks.

Dendrobium Micholitzii Rolfe.

"Densely tufted; pseudobulbs erect, slender at the base, somewhat thickened upwards and quadrangular, 3–4 inches long, diphyllous at the apex; leaves oblong or obvate-oblong, obtuse, coriaceous, 1¼–2¼ inches long; flowers terminal, several, from the axils of a cluster of imbricating oblong bracts, creamy yellow with a greenish orange blotch on the lip, sometimes with purple veins on the flower; pedicels slender, 8–10 lines long; dorsal sepal oblong lanceolate, acute, 2½ lines long; lateral pair triangular, acute, prolonged behind into a stout obtuse somewhat curved mentum 4½–6 lines long; petals linear, acute, 2½ lines long; lip 5–6 lines long, the basal part oblong and somewhat curved, the apex dilated into an obovate obtuse limb, bearing a small oblong crest in the centre; column stout, scarcely over ½ line long.—German New Guinea, Micholitz.

" An interesting addition to the small section *Bolbodium,* allied to *D. pumilum* Roxb., but far larger in all its parts, and the pseudobulbs distinctly quadrangular upwards, as in the Burmese *D. quadrangulare* Parish, which, however, has smaller flowers and a proportionately shorter mentum. The remaining species is the Philippine *D. hymenanthum* Rchb. f." Type in herbarium of the Ames Botanical Laboratory.

Epidendrum Pringlei Rolfe.

" Densely tufted; pseudobulbs ovoid-oblong, 7–10 lines long, 1–2-leaved; leaves linear-oblong, subobtuse, coriaceous, 2-3 inches long; scapes slender, erect, 2½–4 inches long, 1–2-flowered; bracts ovate, apiculate, 1 line long; pedicels 6–8 lines long; sepals broadly lanceolate, acute, 5 lines long, reflexed; petals linear-lanceolate, acute, 5 lines long, reflexed; lip free from column, very shortly stalked, limb dilated into a transversely oblong or suborbicular blade, about 5 lines long by 7 broad, thickened at the base into a two or three-keeled callus from which three slender nerves extend toward the apex; column 2 lines long, broadly clavate.—Mexico, State of Morelos, near Cuernavaca, on tops of mountains, at 8,000 ft. altitude; C. G. Pringle, May 12, 1898.

" A species of the *Encyclium* section, nearly allied to *E. hastatum* Lindl., but more slender and smaller in all its parts. The sepals and petals are somewhat fleshy, and appear to have been dusky brown in colour, while the limb of the lip is membranaceous and white. Of known species it can only be compared with the one mentioned, but it is well characterised by its very slender habit." Type in herbarium of the Ames Botanical Laboratory.

Epidendrum oaxacanum Rolfe.

" Stems erect, subterete, leafy, 1¾–2¼ ft. high; leaves oblong, subobtuse, coriaceous, 3–4 inches long, ¾–1 inch broad; inflorescences terminal and axillary on the upper part of the stem, somewhat branched, aggregated into a loose head 2½–3 inches long, covered with lanceolate-oblong imbricating striate sheaths at the base; bracts triangular-ovate, acute or acuminate, 1½–2 lines long; pedicels 5–7 lines long, slender; dorsal sepal narrowly spatulate-lanceolate, subobtuse, lateral pair rather broader, all more or less convolute, 5–6 lines long; petals narrowly spatulate-linear, subobtuse, 5–6 lines long; lip adnate to the column, limb three-lobed, 5 lines broad; front lobe ovate-oblong, obtuse, with three prominent erect keels; side lobes spreading, broadly oblong, obtuse, with about five thickened veins; lobes about 2 lines long; disc bearing a pair of broadly oblong crests near the base of the side lobes; column clavate, 4 lines long.—Mexico; State of Oaxaca, Sierra de San Filipe, at 7,500 ft. altitude; C. G. Pringle, Nov. 19, 1894, n. 5830.

" An interesting addition to the small section *Acropleuranthium,* characterised by having both terminal and axillary inflorescences, of which *E. exasperatum* Rchb. f. and *E. Wallisii* Rchb. f. have hitherto been the known representatives. It is very distinct from either and from the dried specimens appears to have yellowish green flowers." Type in herbarium of the Ames Botanical Laboratory.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTION OF A NEW SPECIES OF BLIND EEL, OF THE GENUS *ANGUILLA*.

BY HUGH M. SMITH.

[Contribution from U. S. Bureau of Fisheries.]

On July 31, 1902, during a cruise of the schooner *Grampus* to the tile-fish grounds lying on the inner edge of the Gulf Stream, the writer collected at the surface, 60 miles south of Nomans Land, a small eel which represents a hitherto unknown species of *Anguilla*, and is here diagnosed and figured.

Anguilla cæca Smith, new species.

Similar to the common eel, *Anguilla chrisypa* Rafinesque, but with the head and snout somewhat broader, the mandible longer and more projecting, the eyes completely covered by skin and the body uniformly black. Body cylindrical anteriorly, compressed posteriorly, the depth contained 2.7 times in length of head; head about .12 total length; mouth large, lower jaw strongly projecting; teeth small, in a band in each jaw, a small patch also on vomerine; anterior nostrils tubular, posterior nostrils simple pits in front of eye; a large pore on each side half-way between nostrils, and a row of large pores on each side of lower jaw; branchial aperture vertical, about length of base of pectoral, extending below base of pectoral; pectoral fins well developed, .25 length of head; dorsal origin posterior to gill-opening a distance equal to 1.6 length of head; anal origin posterior to dorsal a distance equal to .66 length of head. Scales not evident. Skin uniformly jet black; fins dark reddish brown by transmitted light; skin over eyes not appreciably thinner than elsewhere. Eyes about as large as those of common eel of same size and placed posterior to the angle of the mouth, their position indicated by a slight elevation.

The type, 6 cm. long, has been deposited in the United States National Museum, and is numbered 51,483 on the fish register.

From the foregoing description it will be seen that this species closely resembles *A. chrisypa*. Comparing it with a specimen of the common eel of the same size, of the pale, translucent type, taken from a tributary of Casco Bay, Maine, May 13, 1903, the most striking differences, besides the absence of functional eyes, are in the length of the lower jaw and the location of the eyes posterior to the angle of the mouth, as shown in the accompanying figures of these two specimens.

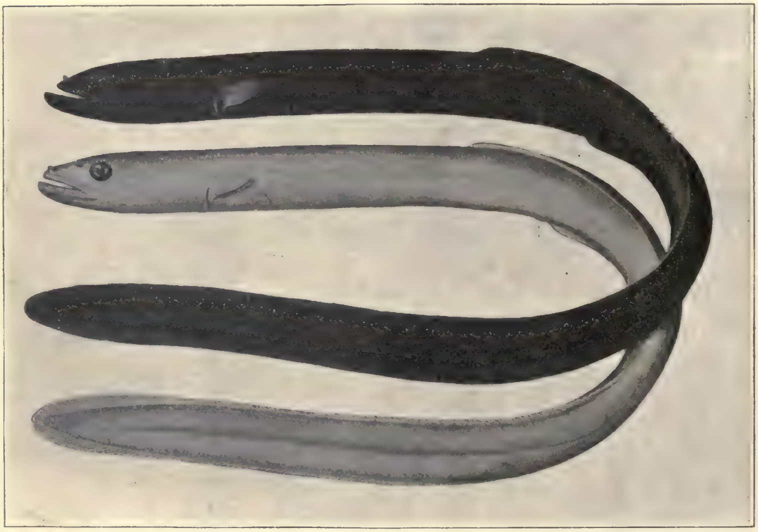

FIG. 1. Comparison of type of *Anguilla cæca* Smith (upper figure) with specimen of *Anguilla chrisypa* Rafinesque (lower figure) of same size.

Although this fish was found at the surface, in a locality where the water was about 50 fathoms deep, it is evident that it is a bottom species, and that the type was a stray.

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PROCEEDINGS

OF THE

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FOUR NEW GRASSHOPPER MICE, GENUS *ONYCHOMYS.*

BY C. HART MERRIAM.

Among the large series of grasshopper mice in the collection of the Biological Survey are four forms which appear to require recognition by name. Three of these belong to the small *torridus* group; the fourth to the much larger *leucogaster* group. The new forms may be known from the following descriptions:

Onychomys torridus tularensis subsp. nov.

Type from Bakersfield, Kern County, Calif. Adult female, No. $\frac{29711}{41786}$, U. S. National Museum, Biological Survey Collection. July 19, 1891. A. K. Fisher. Orig. No. 792.

Characters.—Size small; color pale drab gray, barely tinged with buffy. Similar to *O. torridus longicaudus* but much paler and without the ochraceous suffusion. Compared with *O. ramona* the difference is still more marked, *ramona* being a very dark form. The type specimen has just moulted the hair of the face and head and as a result the new pelage on these parts is darker than usual.

Range.—The Tulare basin from Huron and Alcalde south, and adjacent Carrizo Plains on the west and Kern Valley on the east.

Measurements.—Average of 5 adults: Total length, 143; tail vertebræ, 50.5; hind foot, 21.

Onychomys torridus yakiensis subsp. nov.

Type from Camoa, Rio Mayo, southern Sonora, Mexico. Adult female, No. 95,855, U. S. National Museum, Biological Survey Collection. Oct. 28, 1898. E. A. Goldman. Orig. No. 13,158.

Characters.—Color similar to that of *Onychomys torridus ramona*, but size slightly larger (hind foot averaging 22.5 instead of 20.5). Median dorsal area, from crown to base of tail, usually much darker than sides of back. Compared with *torridus*, *longicaudus*, and *ramona*, the molar teeth, particularly the anterior molars, are broader and heavier, and the palate usually ends posteriorly in a median projection—in *torridus* and *ramona* it is concave.

Measurements.—Type specimen: Total length, 154; tail vertebræ, 53; hind foot, 22. Average of 6 specimens from type region: Total length, 149; tail vertebræ, 53; hind foot, 22.5.

Remarks.—*Onychomys yakiensis* has the dark head, large ears, and general coloration of *ramona*, in which respects it differs from typical *torridus*. Its range appears to be western Sonora and northern Sinaloa, and may join that of *ramona* around the head of the Gulf of California. The collection of the Biological Survey contains 19 specimens of this form from Camoa and Alamos, Sonora, and Sinaloa, Sinaloa. The series comprises both pelages (grayish brown and dull fulvous) and various ages. The young when half grown are dark gray like those of *ramona;* when nearly full grown they are pale smoke gray, much paler than *ramona* of corresponding age.

Onychomys torridus canus subsp. nov.

Type from San Juan Capistrano, Zacatecas, Mexico. Adult female, No. 90,843, U. S. National Museum, Biological Survey Collection. Aug. 23, 1897. E. W. Nelson and E. A. Goldman. Orig. No. 11,574.

Characters.—Similar to *torridus* in general characters, but tail and ears longer, and color drab gray or grayish clay-color instead of fulvous.

Measurements.—Type specimen: Total length, 152; tail vertebræ, 55; hind foot, 22. Average of 5 specimens from type locality: Total length, 150; tail, 54; hind foot, 22.

Remarks.—In addition to the Zacatecas specimens, others are at hand from Rio Verde and Jesus Maria, San Luis Potosi.

Onychomys leucogaster albescens subsp. nov.

Type from Samalayuca, Chihuahua, Mexico. Adult female, No. 50,040, U. S. National Museum, Biological Survey Collection. Dec. 12, 1892. C. P. Streator. Orig. No. 2399.

Characters.—Size large. Similar to *O. leucogaster pallescens* from Hopi Pueblos of Arizona, but much paler, and with cheeks and thighs snowywhite. Upperparts buffy, deepest on rump; face from nose to eyes whitish, faintly washed with buff; *cheeks, legs, and thighs snow-white* like underparts.

Skull, compared with that of *pallescens*, smaller and weaker, braincase narrower, more rounded (less flattened on top); rostrum weaker; zygomata much narrower and rounded off anteriorly, slightly spreading posteriorly. [In *pallescens* as in *leucogaster* they stand out much farther and more squarely, enclosing a much larger orbital fossa.]

Measurements.—Type specimen: Total length, 160; tail vertebræ, 60; hind foot, 23.

Remarks.—The type specimen, which is in fresh winter pelage, has long soft fur and is the most beautiful mouse I have ever seen. With it are two young-adults, not quite full grown, from the same locality. One of these is like the type, only not quite so pale; the other has the upperparts pale smoke-gray slightly suffused with buffy.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW POCKET MICE OF THE GENUS *PEROGNATHUS.*

BY WILFRED H. OSGOOD.

Several hundred specimens of pocket mice have been secured by field parties of the Biological Survey since the publication of the last revision of the genus *Perognathus.** Among these are many which serve to increase the knowledge of the distribution and relationships of the various species and subspecies. The new material also indicates that two well-marked subspecies are still unnamed. They may be known as follows:

Perognathus flavescens perniger subsp. nov.

Type from Vermilion, South Dakota. Young-adult female, No. 57,725, U. S. National Museum, Biological Survey Collection. Aug. 22, 1889. G. S. Agersborg.

Characters.—Size, proportions, and skull much as in *P. flavescens;* color of upperparts chiefly intense black; underparts chiefly ochraceous buff.

Color.—Median dorsal region intense black or brownish black to roots of hairs; sides and head mixed black and ochraceous buff; ears brownish black very narrowly edged with buffy; inferior subauricular spot bright buff, superior one nearly obsolete; lateral line ochraceous buff, broad and sharply contrasted; underparts rich ochraceous buff except chin and a narrow stripe on throat and breast, which are white; tail dusky above, whitish below, narrowly buffy on sides; feet buffy, toes paler.

Skull.—As in *P. flavescens.*

Measurements.—Type: Total length, 140; tail vertebræ, 68; hind foot (dry), 17.

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* *North American Fauna,* No. 18, September 20, 1900.

Remarks.—The type of this subspecies has been in the collection of the Biological Survey for a number of years. It has heretofore been doubtfully referred to *flavescens* on the assumption that its very dark color was due to melanism or other abnormal condition. Apparently this is not the case, for a second specimen from Vermilion, South Dakota, while quite immature, shows the same dark color, and two adults from Verdigris, Nebraska, are distinctly intermediate. One of these, collected April 23, 1903, by Merritt Cary, has decidedly more dusky than is usual in *flavescens*, and has the posterior half of the underparts almost entirely buff. The other, collected by V. Bailey, June 11, 1893, is more like *flavescens* in the color of the upperparts, but has the buffy suffusion on the belly. The specimens from Vermilion, South Dakota, seem to represent an extreme development of these characters. Typical *flavescens* invariably has pure white underparts, and except in very high pelage is quite pale throughout. Its home is in the sand hills of Nebraska, where conditions are decidedly different from those in the more humid region inhabited by *perniger*.

Perognathus californicus ochrus subsp. nov.

Type from Santiago Springs (16 miles southwest of McKittrick), Kern County, California. Young-adult female, No. 130,348, U. S. National Museum, Biological Survey Collection. July 30, 1903. Luther J. Goldman.

Characters.—Similar to *P. californicas dispar*, but decidedly paler.

Color.—Upperparts mixed pinkish buff and dusky, producing a general effect varying from ecru drab to broccoli brown ; lateral line pale pinkish buff; underparts creamy white; tail hair brown above, white below; hands and feet white.

Skull.—As in *P. c. dispar.*

Measurements.—Average of 10 young-adult topotypes: Total length, 200 (190–216); tail vertebræ, 108.7 (100–119); hind foot, 25.

Remarks.—This pale form of *P. californicus* seems to be confined to the region about the lower end of the San Joaquin Valley. The palest specimens are those from localities nearest the bottom of the valley. Specimens from Tehachapi and Old Fort Tejon show a slight approach to *dispar*, to which they were formerly referred. A series from Three Rivers, Kern County, is typical of *dispar*, which seems to indicate that the range of this form is interrupted in the passes at the foot of the San Joaquin Valley by the paler form *ochrus*. *P. c. dispar* is itself slightly paler than *californicus*, but the principal reason for recognizing it is its larger size and cranial characters. Should these cranial characters prove inconstant on the acquisition of larger series of true *californicus*, *dispar* would fall as a synonym of *californicus*. In any case the form here called *ochrus* would merit recognition.

Specimens examined.—Total number, 65, from localities in California as follows: Alcalde, 1; Carrizo Plains, 1; Cayama Valley, 3; Fort Tejon, 2; 25 miles above Kernville, 1; Onyx, 4; Painted Rock, 25 miles southeast of Simmler, 1; San Emigdio, 4; San Emigdio Canyon, 5; Santiago Springs, 16 miles southwest of McKittrick, 36; Tehachapi, 2; Tejon Canyon, 5.

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OF THE

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TWO NEW SQUIRRELS OF THE *ABERTI* GROUP.

BY C. HART MERRIAM.

Mr. John T. Stewart has recently sent me two specimens of a new squirrel collected hy him in the pine forest on the Kaibab Plateau in northern Arizona. One of these, a female, was obtained in August; the other, a male, in December. They agree in essential characters and differ strikingly from the well known Abert squirrel of the pine forest of the Arizona plateau south of the Grand Canyon. Mr. Stewart, while at work with a field party of the U. S. Geological Survey on the north side of the Grand Canyon, saw seven and obtained four of the new squirrels; he found them scarce and wild.

In addition to the above-mentioned species the Biological Survey collection contains a number of specimens of a pale form of the Abert squirrel from the south end of the Cimarron Mountains in northeastern New Mexico, mainly from the neighborhood of Hall Peak. Both of these are here described.

Sciurus kaibabensis sp. nov.

Type from head of Bright Angel Creek, top of Kaibab Plateau, north side of Grand Canyon of Colorado, Arizona. Adult male, No. 130,982, U. S. National Museum, Biological Survey Collection. December 1, 1903. John T. Stewart.

Characters.—Similar in size and general characters to *S. aberti*, but underparts *mainly black* instead of white, and tail mainly *white all over* instead of white on under side only.

Color.—Upperparts from nose to base of tail dark grizzled gray, considerably darker than in *aberti;* back with a ferruginous dorsal area extending from shoulders to rump, and sometimes reaching anteriorly to top of head as in *aberti;* lower sides, upper part of fore legs, and thighs, mainly solid black; median parts below, from mouth to base of tail, black mixed with gray; ears in summer blackish (in *aberti* gray), in winter anterior fold gray, tufts black; tail white, except extreme base, which is gray, and an indistinct streak along the middle of upper side, which is dark buffy gray, ending in a subterminal blackish band; nose black; face (including cheeks and sides of nose), fore feet, and toes finely mixed gray and black; hind feet in summer mainly gray, in winter mainly black.

Sciurus aberti mimus subsp. nov.

Type from Hall Peak, at south end of Cimarron Mountains, northeastern New Mexico. Adult female, No. 70,908, U. S. National Museum, Biological Survey Collection. January 16, 1895. C. M. Barber. Original No. 61.

Characters.—Similar to *S. aberti*, but gray of upperparts decidedly paler; red dorsal area usually obsolete or nearly so; upper side of tail paler; ear tufts pale fulvous, grizzled and tipped with black (instead of mainly black); tail apparently shorter.

Measurements of type specimen.—Length, 485; tail vertebræ, 215; hind foot, 70.

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OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

JACK RABBITS OF THE *LEPUS CAMPESTRIS* GROUP.

BY C. HART MERRIAM.

The large white-tailed jack rabbit of the Northern Plains was named *Lepus campestris* by Bachman in 1837. The type specimen came from the plains of the Saskatchewan. Two years later (1839) he described, under the name *Lepus townsendi*, a closely related species from Walla Walla, on the plains of the Columbia. Waterhouse, in 1848, united the two, placing *townsendi* as a synonym under *campestris*. This course has been followed by subsequent naturalists.

An examination of the jack rabbits of this group in the collection of the U. S. Biological Survey shows that *townsendi* is a strongly marked form of the *campestris* group, and that another form, heretofore unrecognized, but here named *sierræ*, inhabits the Sierra Nevada of California. The three forms, with their ranges so far as now known, may be defined as follows:

Lepus campestris Bachman.

Lepus campestris Bachman, Journ. Acad. Nat. Sci., Phila., VII, Pt. 2, 349-352, 1837.

Type locality.—Plains of Saskatchewan.

Range.—Northern Great Plains from Plains of Saskatchewan southward to Kansas, and from Minnesota westward to the Rocky Mountains. From

Green River Basin in southwestern Wyoming the range spreads westerly over eastern Idaho, northern Utah, and northeastern Nevada.

Characters.—Upperparts yellowish gray; thighs grayish, washed with fulvous, becoming snow-white in early fall; tip of ear margined anteriorly by black, posteriorly marked by a broad squarish black patch changing abruptly to the white below; tail wholly snow-white, some specimens showing a faint trace of a median dorsal line; upper surface of fore leg and fore foot ochraceous, sparingly sprinkled with black hairs; eye surrounded by a broad conspicuous white ring; top of head and front of ears yellowish gray or buffy yellowish, varying to buffy fulvous; pectoral collar buffy yellowish.

Measurements.—Average of 5 specimens from Wyoming: Total length, 615; tail vertebræ, 92; hind foot, 152.

Lepus campestris townsendi Bachman.

Lepus townsendi Bachman, Journ. Acad. Nat. Sci., Phila., VIII, Pt. I, 90–94, 1839.

Type locality.—Walla Walla, Washington.

Range.—Plains of the Columbia, in Oregon and Washington.

Characters.—Upperparts clear gray; thighs and hind legs deep gray; tip of ear not bordered anteriorly by black, the black showing along the edge only; posterior ear-patch narrow, forming only a border, which fades out irregularly into gray below and on the inner side; tail white, with a distinct gray median dorsal line or stripe; top of fore leg and fore foot buffy gray, strongly grizzled with black hairs; white ring around eye not conspicuous, the part below the eye indistinct; top of head and front of ears gray or only faintly tinged with pale buffy fulvous; pectoral collar buffy gray.

Measurements.—Average of 5 from plains of Columbia: Total length, 576; tail vertebræ, 81; hind foot, 147.

Lepus campestris sierræ subsp. nov.

Type from Hope Valley, Alpine County, California, altitude 7800 feet. No. 67,863, female, U. S. National Museum, Biological Survey Collection. September 9, 1894. F. Stephens. Original No. 1889.

Range.—In summer, the Sierra Nevada from Lake Tahoe southward to south of Mono Lake; in winter, adjacent sage-brush slopes on east side of Sierra in Nevada and California.

Characters.—Size large; hind foot exceedingly long (167 mm.); weight of type specimen, 8¼ lbs. Similar in general to *townsendi*, but feet much larger and ears broadly tipped with black on both sides, more broadly even than in *campestris*, the black covering the tip of the anterior or upper fold in front as well as behind, and forming a large rectangular patch behind; back, thighs, and pectoral collar gray, as in *townsendi;* upper side of tail with a conspicuous broad gray median band, tapering to a point and disappearing before reaching tip; white ring around eye broad and conspicuous above and behind the eye, narrow below posteriorly, disappearing anteriorly; upper lip and sides of nose, including patch at base of whiskers, intense buffy fulvous; pectoral collar and flanks gray, the gray of flanks encroaching on belly; top of fore legs grizzled buffy fulvous; wrists and fore feet dirty yellowish white; hind feet white.

Remarks.—The latter part of September, 1900, John Muir and I, after ascending Bloody Canyon to Mono Pass, came upon one of these large hares among the Murray and white bark pines on the west side about two miles below the Pass, and near Dana Creek, which is one of the heads of Tuolumne River. The Paiute Indians at Mono Lake showed me a number of snow-white winter skins of this rabbit, and told me that in winter it comes out of the mountains and inhabits the higher sage-brush slopes on upper Rush Creek, from which locality the Biological Survey has recently secured specimens, through the courtesy of Will J. Farrington, of Mono Lake. All of these specimens unfortunately are in the white winter pelage, though most of them show some dark gray on the head and some pale fulvous on the ears, nose, and fore feet. The ears are strongly washed with pale fulvous. The ear-tips are black on both sides, but the black area is not so large as in the specimen in summer pelage from Hope Valley. In typical *campestris* also the black ear-tips are smaller in winter than in summer.

Measurements.—Type specimen: Total length, 635; tail vertebræ, 112; hind foot, 167.

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OF THE

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UNRECOGNIZED JACK RABBITS OF THE *LEPUS TEXIANUS* GROUP.

BY C. HART MERRIAM.

The *texianus* group of jack rabbits comprises a number of species and subspecies inhabiting the western part of North America from the State of Durango in Mexico north to South Dakota and the Columbia River, and from middle Texas west to the coast region of California. One of these, *Lepus texianus deserticola* Mearns, occupies the Colorado and Mohave deserts and the desert region generally east of the High Sierra.

Another subspecies inhabits the Plains of the Columbia in Oregon and Washington. It resembles *deserticola*, but is much darker, and may be distinguished by other characters pointed out in the accompanying description. It is here named *Lepus texianus wallawalla*.

In the interior of California, west of the Sierra, three forms occur:

(1) *Lepus californicus* Gray, 1837. A large, highly-colored, reddish brown or fulvous species, inhabiting the coast region from San Diego northward, spreading over the Sacramento Valley and foothills of the northern Sierra, and continuing over Shasta Valley to the Rogue River and Willamette Valley in Oregon. Type locality, San Antonio, Calif., doubtless the old Mission of that name a few miles north of Jolon, Monterey County.

(2) *Lepus richardsoni* Bachman, 1839. A form resembling *californicus*, but slightly smaller and much paler in color, lacking the reddish suffusion, the general tone of the upperparts being buffy grayish instead of reddish brown. This form inhabits Salinas Valley and bordering ranges on both sides, follows the mountains around the south end of the Joaquin Valley, and passes north in the foothills of the Sierra to about the latitude of San Francisco. The type locality may be fixed in Salinas Valley or the mountains close by on the west, probably not far from Jolon. It was described by Bachman in 1839, but was regarded by Waterhouse as the same as *californicus*, and for more than fifty years has been so considered.

(3) An exceedingly pallid form, inhabiting the hot south end of the San Joaquin Valley. This form seems to have escaped a name, and is here described as *Lepus tularensis*.

The type specimens of both *L. californicus* and *L. richardsoni* were collected by the botanist David Douglas in 1831, presumably on his overland journey from Monterey to Santa Barbara. In fact, Gray gives San Antonio as the locality for *californicus*. This was doubtless the old Mission of San Antonio, situated in the valley of the same name in the coast ranges west of Salinas Valley, a few miles south of Santa Lucia Peak and a little north of the present town of Jolon, Monterey County. *Lepus richardsoni* inhabits the same region, the western edge of its distribution joining the eastern edge of that of *californicus* along a line extending parallel to the coast from Jolon to San Luis Obispo. The collection of the Biological Survey contains specimens of *richardsoni* from Jolon, Paso Robles, and San Luis Obispo, and of *californicus* from a few miles west of San Luis Obispo. As Douglas states in a letter to Sir Joseph Hooker that he collected in this region and visited the Santa Lucia Mountains in lat. 36°, there is every reason to believe that the type specimens of both *californicus* and *richardsoni* were collected in the same general neighborhood.

Lepus tularensis sp. nov.

Type from Alila (in bottom of San Joaquin Valley), Tulare Co., California. No. 126,334, adult female, U. S. National Museum, Biological Survey Collection. October 25, 1900. Luther J. Goldman.

Characters.—Similar in general to *L. texianus deserticola,* but usually paler and more yellowish; size rather small for the *texianus* group; color pale buffy grayish with a yellowish tone; back only slightly grizzled with black hairs; nape patch *whitish;* face, particularly sides of face and neck, pale buffy yellowish or yellowish buff, only slightly grizzled by dark hairs; pectoral collar pale yellowish; black ear-tips not sharply defined below; thighs grayish clay color; underparts white, with only a tinge of pale yellowish buffy on the sides; skull long and slender; frontals and nasals very narrow.

Measurements of type specimen.—Total length, 558; tail vertebræ, 84; hind foot, 117.

Remarks.—*Lepus tularensis* is a pallid form inhabiting the hot Bakersfield-Tulare Basin at the extreme south end of the San Joaquin Valley, whence it extends over the adjacent Carrizo Plain on the west. In winter its domain is invaded by the foothill species of the surrounding region, *Lepus richardsoni* Bachman, both occurring at Alila, Bakersfield, and other points not too far from the base of the hills.

Lepus texianus wallawalla subsp. nov.

Type from Touchet, Plains of Columbia, Washington. Adult female, No. $\frac{23923}{21328}$, U. S. National Museum, Biological Survey Collection. Sept. 18, 1890. C. P. Streator. Original No. 271.

Characters.—In summer pelage similar to *L. texianus deserticola,* but upperparts darker; in fresh winter pelage similar to *eremicus* and *richardsoni.* Skull and hind foot small as in *deserticola* and *tularensis* (contrasted with the large-footed forms *texianus, eremicus,* and *californicus*). Compared with *deserticola,* the ears are shorter; hind foot slightly larger; color of upperparts decidedly darker, partly from much greater admixture of black hairs and partly from a dull buffy fulvous suffusion. In fresh fall pelage (middle October) *wallawalla* becomes strongly suffused with pale buffy fulvous, most intense on sides, and the pectoral collar is still more deeply fulvous. The top of head and sides of face remain grizzled gray (nearly as gray as in *richardsoni*), but a broad ring around the eye and the sides of the neck are pale fulvous, almost but not quite so pronounced as in *eremicus.* The fronts of the ears are finely grizzled fulvous brown, darker than in *eremicus* and less gray than in *richardsoni* and *deserticola.* In summer pelage the fulvous suffusion is lost, the eye ring becomes nearly white, the cheeks pale buffy gray with very little grizzling, and the pectoral collar pale yellowish buffy.

Measurements of type specimen.—Total length, 555; tail vertebræ, 95; hind foot, 126. Average of hind foot in 4 specimens, 127.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NEW AND LITTLE KNOWN KANGAROO RATS OF THE GENUS *PERODIPUS.*

BY C. HART MERRIAM.

The kangaroo rats, a group peculiar to the arid parts of North America, are represented by three genera—*Dipodomys*, *Perodipus*, and *Microdipodops*. The latter is very much more distinct from the others than they are from each other. *Dipodomys* and *Microdipodops* have been previously studied, and the species have been published, but up to the present time only a beginning has been made in working out the species of *Perodipus*. A study of the rich collections of the Biological Survey leads me to recognize nine new forms, which are here described. One of these, named *ingens*, is a very large animal for a kangaroo rat, equaling in size *Dipodomys spectabilis* from Arizona and New Mexico. It inhabits the hot Carrizo Plain and adjacent southern end of the San Joaquin Valley in California. Another species, *P. microps*, from Lone Pine, Owens Valley, is the smallest of the genus thus far discovered, being smaller even than *ordi* and *columbianus*.

A curious feature connected with the kangaroo rats of this genus is that most of the species and subspecies may be arranged in four groups according to size: The small *ordi* group, the slightly larger *montanus* group, the decidedly larger *agilis* group, and *ingens*, the largest of all. Another interesting feature is that in many localities two species occur together, and in several places three may be found within a distance of a few miles. The various species appear to be highly sensitive to climatic conditions, and adhere very closely to definite zone positions. As a result, it is not uncommon in the Great Basin region to encounter two or three species in ascending from the bottom of a desert valley to the adjacent mountain slopes. The great majority of species belong to the Upper Sonoran zone, of which some inhabit the upper part, some the lower. A few belong to the Lower Sonoran and Transition zones respectively, and one species—*montanus* of Baird—apparently enters the lower edge of the Boreal.

Like the other kangaroo rats, the members of the genus *Perodipus* are primarily desert animals. A few species inhabit the bare open deserts, but most of them live in the brushy deserts, and at least two of the California species—*streatori* and *venustus*—live among the manzanita thickets of the mountain slopes—a very curious place in which to find a kangaroo rat. One of these species, *venustus*, inhabits the Santa Cruz Mountains, and was also obtained by the Goldman brothers and myself on the very top of Santa Lucia Peak, in the coast ranges, at an altitude of 6000 feet.

Note on Perodipus montanus Baird.

Dipodomys montanus Baird, Proc. Acad. Nat. Sci. Phila., VII, p. 334, 1855.

Perodipus montanus of Baird is a well-marked species, a little larger than *ordi*, but decidedly smaller than *agilis*, *longipes*, and *richardsoni*. It was collected by F. Kreuzfeldt on Captain Beckwith's expedition, in San Luis Valley, south central Colorado, near Old Fort Massachusetts (now Fort Garland), from which point the Biological Survey has obtained a large series of topotypes. By a curious error, Dr. E. A. Mearns has identified the species with *Dipodomys elator* Merriam of Texas (Proc. Biol. Soc. Wash., XIII, 167, Oct. 31, 1900). Fortunately, Baird's type specimen of *montanus* is still in existence, in the U. S. National Museum. Comparison of this type with the above-mentioned series of topotypes shows them to be identical, and to differ widely from *Dipodomys elator* of Texas.

Doctor Mearns may have been misled by the fact that the fifth toe (really the thumb) which distinguishes *Perodipus* from *Dipodomys* is not apparent in the type specimen, for the reason that the hind feet were skinned down to the toes and the bones removed. In all other respects it agrees with the topotypes of *montanus.* Externally it has the small ears and relatively small, pale, crested tail of *P. montanus,* thus differing widely from *Dipodomys elator,* which has larger ears and a long round tail ending in a pure white brush about an inch in length, below which the upper and under tail stripes are nearly black. The whitish tip in the type of *montanus* is widely different, and results from the wearing off or suppression of the pale brownish wash which usually suffuses the tips of the hairs. Some of the topotypes are in exactly the same condition and match the type perfectly.

In comparing skulls of topotypes of *P. montanus* with those of *D. elator,* it appears that *montanus* has weaker and narrower maxillary arches, narrower nasals, narrower premaxillæ, and narrower rostrum as a whole, and also differs in the enamel face of the upper incisor teeth. In all of these characters, the skull of Baird's type specimen, although not fully adult and somewhat imperfect, agrees with the topotypes and departs from *D. elator.* Furthermore, *P. montanus* came from the neighborhood of Fort Garland at an altitude of nearly 8000 feet, in the upper part of the Transition zone, while *D. elator* came from Henrietta, Texas, at an altitude of less than 1000 feet and in the Lower Sonoran zone.

Perodipus montanus may be known from the following description:

Characters.—Size medium or rather small; tail rather short; ears small; upperparts dull buffy ochraceous, abundantly lined on the head with fine dark-tipped hairs; the back in summer pelage shading toward clay-color, produced by brownish tips to the hairs; end of nose above the small white tip indistinctly dusky; patch at base of whiskers dusky; upper or interior fold of ear pale fulvous, with a dark spot near the tip, followed by a small whitish point which comes over from the back side of the ear, which is mainly white; upper tail stripe pale brownish drab, normally continuous to extreme tip; under tail stripe narrowing toward tip, and often absent beyond end of vertebræ.

Skull.—Intermediate in size between *ordi* and *richardsoni;* rostrum, nasals, and premaxillæ rather narrow; bullæ rather large for size of skull; maxillary arch rather weak and narrow, but with well-developed rounded outer angle; supraoccipital and interparietal broad. The skull as a whole closely resembles that of *ordi,* but is larger, the total length averaging about 38 mm. instead of 36. The maxillary arch is actually only a trifle larger than in *ordi,* thus being relatively smaller.

Measurements.—Average of 40 specimens from type locality: Total length, 250; tail vertebræ, 140; hind foot, 40.8.

Perodipus ingens sp. nov.

Type from Painted Rock, 20 miles southeast of Simmler, Carrizo Plain, San Luis Obispo Co., California. Adult male, No. 128,805, U. S. National Museum, Biological Survey Collection. August 6, 1903. Luther J. Goldman. Original No. 777.

Characters.—Size huge, not only very much larger than the largest known species of *Perodipus*, but equaling *Dipodomys spectabilis.* Skull about double the bulk of the largest previously known *Perodipus*, and relatively heavy and massive. Color buffy ochraceous; upper and lower tail bands black, uniting at end of vertebræ, beyond which the pencil is white, superficially washed with dusky (chiefly on upper surface). Ears relatively small, actually not larger than in *agilis.*

Measurements.—Type specimen: Total length, 360; tail vertebræ, 191; hind foot, 54. Average of 6 specimens: Total length, 350; tail vertebræ, 190; hind foot, 52. Skull of type: Total length, 48 mm.; occipito-nasal length, 45; basal length, 34; zygomatic breadth, 23.5; breadth across bullæ, 30.5; breadth of frontals posteriorly, 17, behind lachrymals, 15; length of nasals, 18.

Remarks.—Perodipus ingens so greatly exceeds in size all known species of the genus that no comparison is necessary. Its range, so far as known, is the Carrizo Plain and adjacent southwestern border of the San Joaquin Valley. Specimens were collected by L. J. Goldman at three localities: Carrizo Plain (8 miles east of Simmler), Painted Rock (20 miles southeast of Simmler), and McKittrick (in western Kern County, about 35 miles west of Bakersfield). Whether or not it spreads over suitable parts of the Kern-Tulare basin remains to be ascertained.

Perodipus venustus sp. nov.

Type from Santa Cruz, Santa Cruz Co., California. Adult male, No. 51,852, U. S. National Museum, Biological Survey Collection. March 12, 1893. G. B. Badger. Original No. 46.

Range.—Santa Cruz and Santa Lucia Mountains, California.

Characters.—In size and general characters similar to *P. agilis*, but color *very much darker;* nose black, passing into black band at base of whiskers; top of head, back, and thigh patches dusky, finely grizzled with ochraceous, the ochraceous becoming more distinct on sides; ears large and nearly black, with the usual pale spots at base, and at top of fold; ankle, sides of heel, sole, and tail stripes nearly black; hairs of rump forming a black patch just in front of basal white ring of tail.

Skull.—Similar to that of *agilis* but slightly longer; maxillary arch of zygoma broader on outer side, with a pronounced outer angle (lacking in *agilis*); jugal weaker; nasals slightly larger (both longer and broader); premaxillæ broader; incisors heavier. Compared with *P. tularensis*, the nasals and premaxillæ are broader, the outer angle of maxillary arch less developed, the bullæ more projecting posteriorly.

Measurements.—Type specimen: Total length, 339; tail vertebræ, 211; hind foot, 46. Average of 14 from type locality: Total length, 316; tail vertebræ, 191; hind foot, 45.3.

Perodipus goldmani sp. nov.

Type from Salinas, mouth of Salinas Valley, Monterey Co., Calif. Young-adult male, No. 118,924, U. S. National Musuem, Biological Survey Collection. September 4, 1902. Luther J. Goldman. Original No. 431.

Characters.—Size large, nearly as large as *venustus*, but tail shorter and ears smaller. Coloration intermediate between the paler *agilis* and the darker *venustus*. Upperparts finely mixed dusky and buffy ochraceous, resulting in a drab-brown which covers the head and back, becoming grizzled ochraceous on the flanks; dusky marks at base of whiskers and on ankles large and conspicuous.

Skull.—Similar to that of *tularensis*, but nasals and premaxillæ broader.

Measurements.—Type specimen: Total length, 312; tail vertebræ, 185; hind foot, 46. Average of 8 from type locality: Total length, 313; tail vertebræ, 185; hind foot, 45.4.

Perodipus agilis tularensis subsp. nov.

Type from Alila, Tulare Co., California. Adult female, No. 127,158, U. S. National Museum, Biological Survey Collection. June 23, 1903. Luther J. Goldman. Original No. 563.

Characters.—Externally like *agilis;* tail slightly longer. Skull similar, but maxillary arches more strongly developed, more broadly spreading, broader antero-posteriorly on outer side, and developing a prominent recurved angle; premaxillæ longer on top of skull (alongside nasals), constricting nasals more abruptly just behind anterior third; sides of fronto-parietal shield less parallel (approximating anteriorly). The skull resembles that of *panamintinus* (with which it agrees in size), but differs strikingly in the nasals, which are shorter, and anteriorly are broader and more abruptly spreading. The supra-occipital is narrower than in *panamintinus*, allowing the bullæ to come nearer together. Externally *panamintinus* is much paler. The skull of *tularensis* compared with that of *venustus* is slightly smaller, nasals and premaxillæ narrower, outer angle of maxillary arch more prominent, bullæ less produced posteriorly.

Remarks.—Specimens are at hand from Alila and Tejon Canyon.

Measurements.—Type specimen: Total length, 308; tail vertebræ, 182; hind foot, 41.

Perodipus montanus utahensis subsp. nov.

Type from Ogden, Utah. Adult male, No. 55,115, U. S. National Museum, Biological Survey Collection. July 15, 1893. Vernon Bailey. Original No. 4085.

Characters.—Similar to *montanus*, but hind foot slightly smaller and decidedly more slender; upperparts less fulvous and more drab or clay color; ears darker, the anterior fold dusky except at extreme tip; under tail-stripe continuous to tip of pencil.

Skull.—Like that of *montanus*, but frontals narrower anteriorly, and tympanic capsule smaller (shorter), with the underpart weak anteriorly.

Measurements.—Type specimen: Total length, 260; tail vertebræ, 150; hind foot, 41. Average of 10 from type locality: Total length, 260; tail vertebræ, 147; hind foot, 40.2.

Perodipus streatori simulans subsp. nov.

Type from Dulzura, San Diego Co., California. Adult female, No. $\frac{33105}{45103}$, U. S. National Museum, Biological Survey Collection. November 24, 1891. C. H. Marsh. Original No. 255.

Characters.—Externally so similar to *streatori* that I have found no constant difference except that the end of tail is not white. In spring (end March) and early fall (August), and probably summer also, the color is paler and more ochraceous than in late fall (October). In October specimens the dusky of the back prevails over the tawny or pale fulvous tones.

Skull like that of *streatori*, but maxillary arch of zygoma less spreading laterally, and cranium less squarely rectangular. In a series of skulls of *streatori* placed side by side the maxillaries almost touch; in a corresponding series of *simulans* they are separated by an interval of about 4 mm.

Some specimens (about 1 in 10) of this subspecies appear to be intermediate between the genera *Dipodomys* and *Perodipus*, inasmuch as they lack the hallux or the hallux has no claw, thus having only 4 claws instead of 5.

Remarks.—This is a wide-ranging form. The Biological Survey collection contains specimens from Dulzura and Twin Oaks (near San Marcos) in San Diego County, and thence northward at least to Morro in San Luis Obispo County.

Measurements.—Type specimen: Total length, 280; tail vertebræ, 165; hind foot, 40. Average of 10 from type locality: Total length, 285; tail vertebræ, 172; hind foot, 41.

Average of 10 *streatori* from type locality (Carbondale, Mariposa County): Total length, 286; tail vertebræ, 175; hind foot, 42.

Perodipus cabezonae sp. nov.

Type from Cabezon, Colorado Desert, California. Adult female, No. 54,055, U. S. National Museum, Biological Survey Collection. May 31, 1893. C. P. Streator. Original No. 2859.

Characters.—Size rather small (between *ordi* and *panamintinus*); ears rather large; color buffy ochraceous. Externally most like *panamintinus*, but ear slightly larger; hind foot shorter; nose paler (usual dark patch obsolete); head and face more fulvous.

Skull.—Rather long and narrow; sides of fronto-parietal shield approximating anteriorly; maxillary arches compressed. Compared with *panamintinus* and *agilis* the maxillary arches are much less spreading, their outer margins slope more strongly backward, and the frontals are narrower between lachrymals (more wedgeshape).

Measurements.—Type specimen (female): Total length, 275; tail vertebræ, 162; hind foot, 42. Average of 8 from type locality: Total length, 282; tail vertebræ, 171; hind foot, 42.3.

Perodipus microps sp. nov.

Type from Lone Pine, Owens Valley, Inyo Co., California. Adult male, No. $\frac{25288}{32701}$, U. S. National Museum, Biological Survey Collection. December 22, 1890. E. W. Nelson. Original No. 138.

Characters.—Size small, as in *ordi* and *columbianus;* ears small and pale; color pale buffy ochraceous, much paler than *ordi* and *columbianus.*

Skull.—Small and rather narrow, and very different from that of any known species; compared with *ordi* and *columbianus,* braincase narrower; nasals narrower; premaxillæ broader; parietals (together) much more acutely pointed posteriorly; breadth of single parietal much less than length (in *ordi* length and breadth subequal), maxillary arch much weaker and more slender, without external angle; supraoccipital between bullæ narrower; incisors thinner (anteroposteriorly) and more vertical (less incurved).

Measurements.—Type specimen: Total length, 282; tail vertebræ, 165; hind foot, 41. Average of 5 from type locality: Total length, 270; tail vertebræ, 158; hind foot, 40.6.

Perodipus microps levipes subsp. nov.

Type from Perognathus Flat, Emigrant Gap, Panamint Mountains, Caliifornia (altitude 5200 ft.) Adult male, No. $\frac{27176}{34575}$, U. S. National Museum, Biological Survey Collection. April 16, 1891. Vernon Bailey. Original No. 2668.

Characters.—Size small, little larger than *microps* from Lone Pine; ears small; color pale buffy ochraceous, as in *microps.* Skull small, with large posteriorly bulging bullæ, and narrow, weak maxillary arches. Compared with *microps* the hind foot and skull as a whole are larger; bullæ decidedly larger; parietals less acutely pointed posteriorly. From *P. cabezonæ,* which has equally large bullæ, it may be told at a glance by the small, narrow, weak, and tapering maxillary arches, and by the very much smaller ears.

Measurements.—Type specimen: Total length, 288; tail vertebræ, 156; hind foot, 43. Average of 10: Total length, 289.5; tail vertebræ, 164; hind foot, 42.4. Total length of skull 38, contrasted with 35 for *microps.*

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF NEW SQUIRRELS FROM MEXICO.

BY E. W. NELSON.

In 1651 Hernandez recorded the presence of flying squirrels in Mexico. The next record south of the United States was in 1861, when Tomes included it in his list of mammals taken by Salvin at Dueñas, Guatemala (P. Z. S., 1861, p. 281). In 1892 I saw a pair of mounted specimens in the museum of the State College at the city of San Luis Potosi. These were recorded as having been taken near Jilitla, in San Luis Potosi. During all of our subsequent work in Mexico, until the present season, whenever in suitable country, both Goldman and I have kept a constant but unsuccessful lookout for these animals. During April, 1904, while in the highlands of Chiapas, near the Guatemala border, Goldman was fortunate enough to secure a good pair of adult flying squirrels with skulls. In view of the striking differences between the Mexican and United States species of *Sciurus* it was a great surprise to find this isolated representative of *Sciuropterus* very closely related to forms found in the United States.

Both the forms of *Sciurus* described below are smaller and paler than their most closely-related subspecies occupying adjoining territory.

Sciuropterus volans goldmani subsp. nov.

MEXICAN FLYING SQUIRREL.

Type No. 132,833, adult male, U. S. National Museum, Biological Survey Collection. From 20 miles southeast of Teopisca, Chiapas, Mexico, collected April 8, 1904, by E. A. Goldman. Original No. 16,667.

Geographic distribution.—Highlands of Chiapas and Guatemala.

Subspecific characters.—Much like *S. volans querceti*, but top of nose white; postocular are a much darker; and underside of flying membrane deep ochraceous buff.

Description of type.—Top of head and upper parts of body nearly uniform reddish brown, slightly more reddish than in *Sciuropterus volans querceti;* upper surface of flying membrane blackish slate color; top of tail cinnamon brown; tops of fore-feet dingy whitish; tops of hind-feet dusky, toes dingy whitish; top and sides of nose, lower part of cheeks, and sides of neck to back of ears whitish; area between eye and ear dusky, shading down into dingy grayish brown on cheeks and sides of head below ears; supraloral spot whitish; underside of neck and body white with a pale suffusion of buff; underside of flying membrane deep ochraceous buff; underside of tail dingy buff. Ears large and broad.

Measurements of type.—Total length, 237; tail vertebræ, 112; hind foot, 30.

Skull characters.—Skull scarcely distinguishable from that of *S. volans querceti.*

Measurements of skull of type.—Basalilar length of Hensel, 28; interorbital width, 7.5; zygomatic width, 22; greatest width of braincase, 17.5; length of nasals, 10.2; width of rostrum, 6; depth of rostrum, 7.

General notes.—This flying squirrel is so closely related to *S. volans* that I have felt constrained to consider it a subspecies although its range is completely isolated by some hundreds of miles of intervening desert country from its nearest relative to the north. The resemblance between the Florida and Mexican flying squirrels is remarkably close; the white top to the nose, slightly more reddish upperparts, and rich fulvous on the underside of the flying membrane are about the only characters that distinguish the Chiapas animal. The lack of contrast between the top of the head and back, the dark postocular area, and the white nose separate it from Texas specimens.

Sciurus poliopus senex subsp. nov.

MICHOACAN SQUIRREL.

Type No. 126,208, adult female, U. S. National Museum, Biological Survey Collection. From La Salada, 40 miles south of Uruapan, southern Michoacan, Mexico. Collected March 14, 1903, by E. W. Nelson and E. A. Goldman. Original No. 16,127.

Geographic distribution.—Below 4,000 feet in the valley of the Balsas River (and tributaries) in central and southern Michoacan and adjacent parts of northwestern Guerrero.

Zonal distribution.—Arid tropical.

Subspecific characters.—Most like *Sciurus p. nemoralis,* but upperparts paler or lighter gray, nuchal patch more clearly defined yellowish; rump patch more obsolescent.

Description of type.—Top of head iron-gray; nape patch ochraceous mixed with black; rest of back pale grizzled gray with slight mixture of ochraceous grizzling posteriorly, but not sufficient to form a rump patch; sides of body paler than back; top of tail black with heavy wash of white; tops of feet white; underparts of body white; median area on underside of tail dull gray bordered with blackish; outer edge of tail white.

Measurements of type.—Total length, 543; tail vertebræ, 275; hind foot, 69.

Skull characters.—Rostrum heavier and braincase narrower than in *S. p. nemoralis,* with braincase more abruptly constricted posteriorly and occipital diameter shorter.

General notes.—Compared with a similar series of typical *S. p. nemoralis* (the most closely allied form) the present subspecies is distinctly lighter colored, the yellowish nape patch averages decidedly better defined, and the rump patch is scarcely or not at all appreciable in most specimens and poorly defined when present. In all except melanistic specimens the pale grayish wash on the back and sides is underlaid with buffy or yellowish similar in shade to the nape patch and varying in amount so that in some specimens it is scarcely distinguishable, but it usually shows through the overlying gray sufficiently to give a pale yellowish suffusion. As might be supposed from the climatic differences the tail is decidedly slenderer or less bushy than in *nemoralis* and the pelage much thinner and shorter haired. Melanism sometimes occurs in this form, as attested by one specimen taken.

Sciurus poliopus perigrinator subsp. nov.

PUEBLA SQUIRREL.

Type No. 70,279, adult female, U. S. National Museum, Biological Survey Collection. From Piaxtla, Puebla, Mexico. Collected November 25, 1894, by E. W. Nelson and E. A. Goldman. Original No. 7104.

Geographic distribution.—Southern Puebla, northwestern Oaxaca and adjacent parts of Guerrero.

Zonal distribution.—From upper Sonoran to arid tropical.

Subspecific characters.—Most like *Sciurus p. hernandezi* but more brightly colored; rump and nape patches well marked; underside of tail rusty red almost as in typical *poliopus.*

Description of type.—Top of nose and fore part of crown iron-gray; back part of crown and nape marked with a dark ochraceous buffy patch mixed with black; rest of upperparts to rump light iron-gray, underlaid and mixed with ochraceous; sides of body paler than back; rump with a distinct ochraceous patch mixed with black; tops of feet white; upperside of tail black with a strong wash of white and underlaid basally with rusty ochraceous; underparts of body rich cream-buff; underside of tail with broad median area bright ochraceous bordered with black and edged with white.

Measurements of type.—Total length, 535; tail vertebræ, 273; hind foot, 69.

Skull characters.—Skull smaller and lighter than in *S. p. hernandezi;* bullæ smaller; outer end of nasals broadened, producing an inflated tip.

Number of specimens examined.—Five.

General notes.—The brighter colors of the nape and rump patches, the paler back, the reddish color of basal parts of hairs on tail, and the buffy underparts make a combination of characters which easily distinguish this form from its allies. One of these five specimens before me has the underparts pure white; and a half-grown specimen has the underside of the tail dull yellowish gray. The rump and nape patches while distinct are scarcely darker than the underside of the tail.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF FOUR NEW BIRDS FROM MEXICO.

BY E. W. NELSON.

The birds described below were collected by Mr. E. A. Goldman during the spring and summer of 1904 while continuing the work of the Biological Survey in Mexico.

Porzana goldmani sp. nov.

MEXICAN YELLOW RAIL.

Type No. 193,712, adult male, U. S. National Museum, Biological Survey Collection. From Lerma, Mexico. Collected July 11, 1904, by E. A. Goldman. Original No. 10,994.

Geographic distribution.—Known only from type locality in the Valley of Toluca, Mexico.

Specific characters.—Generally similar to *P. noveboracensis* but darker, the wings, flanks, and rump slaty blackish; white markings on back in the form of transverse spots; bill slenderer.

Description of type.—Superciliary stripe, sides of head and neck dark buffy mottled with narrow blackish edgings to feathers; top of head and nape blackish obscurely streaked with narrow dingy buffy edges of feathers; middle of shoulders streaked equally with black and rather dark buffy; sides of shoulders, scapulars and tertials mainly black edged with dark buffy; the black middle of feathers marked with transverse oblong white spots (usually two on each feather); rump blackish with small white spots; primaries dark slaty; secondaries dark grayish with white areas as in *noveboracensis;* wing coverts blackish with small rounded white spots; chin and throat pale dull buffy shading on lower neck and breast into dark dull buffy with feathers on sides of breast tipped with dusky; belly dull whitish; sides of body, flanks, thighs, and crissum dull black with spots and bars of white.

One specimen examined.

Empidonax fulvifrons fusciceps subsp. nov.

Type No. 193,713, adult male, U. S. National Museum, Biological Survey Collection. From Comitan, Chiapas, Mexico. Collected March 29, 1904, by E. A. Goldman. Original No. 10,625.

Geographic distribution.—Highlands of Chiapas and adjacent parts of Guatemala.

Subspecific characters.—In size and color of underparts like typical *fulvifrons;* upperparts darker; crown much darker and strongly contrasted with back.

Four specimens examined; from Comitan, Teopisca, and Tenejapa, Chiapas.

Arremenops superciliosus chiapensis subsp. nov.

Type No. 193,714, adult male, U. S. National Museum, Biological Survey Collection. From San Bartolomé, Chiapas, Mexico. Collected March 15, 1904, by E. A. Goldman. Original No. 10,533.

Geographic distribution.—Valley of the Chiapas River, Chiapas.

Subspecific characters.—Much like *Arremonops s. sumichrasti* but top of head darker, the median stripe on crown darker and grayer; back dark green as in typical *superciliosus;* distribution of buffy on underparts as in *sumichrasti* but color of a deeper or more creamy shade; size as in *sumichrasti.*

Nine specimens examined.

Telmatodytes palustris tolucensis subsp. nov.

MEXICAN MARSH WREN.

Type No. 194,074, adult male, U. S. National Museum, Biological Survey Collection. From Lerma, Mexico. Collected July 5, 1904, by E. A. Goldman. Original No. 10,950.

Geographic distribution.—Known only from Tuluca Valley, Mexico.

Subspecific characters.—Size less than in *palustris;* black dorsal area averages larger; rufous of back brighter; underparts much more reddish buffy.

Description of type (in worn breeding plumage).—Top of head blackish with traces of a brown median line; middle of back black with well defined white shaft streaks; rump and upper tail coverts rich reddish brown; middle tail feathers dull grayish brown mottled with darker and indistinctly barred with same basally; underparts dull dark reddish buffy (including pectoral area) becoming dingy whitish on chin and throat and middle of abdomen.

Measurements of type.—Wing, 51; tail, 40; culmen, 12; tarsus, 20.

Seven specimens examined, all from type locality.

VOL. XVII, PP. 153-156 OCTOBER 6, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FOUR NEW BEARS FROM NORTH AMERICA.

BY C. HART MERRIAM.

Notwithstanding the large number of bears already known from North America, four more appear to require recognition. Three of these are from Alaska; the fourth is a small form of the Black Bear from the desert mountains of eastern Mexico.

Ursus eulophus sp. nov.

Type from Admiralty Island, southeastern Alaska. No. 81,102. Adult male. U. S. National Museum, Biological Survey Collection. 1896. Lieut. G. T. Emmons.

Characters.—Size large, equaling the Sitka bear; color said to be very dark brown. Sagittal crest remarkably high anteriorly; frontals extraordinarily elevated posteriorly; rather narrow interorbitally; frontal shield long and high and in a single flat plane sloping strongly upward from anterior third of nasals almost to fronto-parietal suture (not decurved posteriorly); braincase narrowed and compressed anteriorly, passing gradually into sagittal crest; rostrum rather narrow (as in *horribilis*, as contrasted with the broader *sitkensis*); maxillæ long, reaching back into frontals to beyond plane of nasals; interpterygoid fossa long and narrow; molars larger than in the grizzlies, fully as large as in *sitkensis;* lower carnassial slender, especially anteriorly; $\overline{\text{m 2}}$ narrower and less rectangular than in *sitkensis;* last lower premolar smaller and thinner than in *sitkensis;* incisors small, as in *horribilis* (very much smaller than in *sitkensis*, particularly the outer incisor).

Ursus kenaiensis sp. nov.

Type from Cape Elizabeth, at extreme west end of Kenai Peninsula, Alaska. No. 128,672. Adult female. U. S. National Museum, Biological Survey Collection. 1903. C. A. Lambert.

Characters.—Size large; skull broad, flat and remarkably massive, with exceedingly broad rostrum, not constricted at base, but spreading broadly into zygomata; zygomata broadly spreading; jugal very broad anteriorly; frontals depressed, flattened, low posteriorly; postorbital processes large, blunt, projecting horizontally outward from top of skull; *palate exceedingly broad;* nasals large and broad; anterior nares rather small. Canines small (as in the grizzlies); incisors and molars large. From *Ursus richardsoni*, apparently its nearest relative, it may be distinguished at a glance by larger size, broader palate, and by the form of the temporal ridges, which do not turn abruptly inward behind the postorbital processes. From *kidderi* and *phæonyx* it differs in greater massiveness; much broader rostrum, palate, and zygomata, and flatter frontals. Compared with *kidderi* the skull as a whole is shorter and broader; the incisors and canines of approximately the same size. Compared with *phæonyx* the skull is in every way larger, broader, and far more massive; the canines are approximately the same size; the incisors larger.

Ursus horribilis phæonyx subsp. nov.

Type from Comet Creek (5 miles below head), a tributary of Forty Mile Creek, near Eagle, Alaska. No. 133,231. Old female. U. S. National Museum, Biological Survey Collection. July 12, 1903. W. H. Osgood. Original No. 2684.

Characters.—Similar in general to *U. horribilis*, but claws shorter, more strongly curved, and dark blue-black [in *horribilis* long, flattish, and mainly white]. Ears rather short and *densely haired* on both sides. Color of skin dark brown.

Color.—Back and legs very dark brown, almost blackish brown; tips of hairs on back where not worn off grizzled; underparts and muzzle pale brown.

Cranial and dental characters.—Skull similar to that of *horribilis*, but zygomata more spreading, muzzle broader and shorter, especially broad anteriorly; canines heavier; *incisors decidedly larger.*

Measurements of longest (middle) claw of fore foot.—Over curve, 93 mm.; from top of base to tip, 75; from bottom of base to tip, 55.

Ursus americanus eremicus subsp. nov.

Type from Sierra Guadalupe, Coahuila, Mexico. No. 116,952. Adult female. U. S. National Museum, Biological Survey Collection. April 21, 1902. E. W. Nelson and E. A. Goldman. Original No. 15,111.

Cranial characters of female.—Size and general characters as in *amblyceps*, but frontals in the female *depressed* instead of elevated, the face line (in profile) continuing from end of nose almost to parietals, thus bringing highest part of cranium far back over braincase [in *amblyceps* the highest part is over orbits, on plane of postorbital processes]; frontals flat [in *amblyceps* strongly convex, the sides decurved]; nasals smaller, more wedge-shape, and straight or nearly straight [in *amblyceps* the anterior third is strongly upturned]; rostrum more slender anteriorly; anterior nares narrower; occipitosphenoid length shorter; canines more slender; outer incisors decidedly smaller; upper molars slightly larger, more broadly and squarely truncate anteriorly [in *amblyceps* more rounded and retreating on inner side]. Naked nose pad very long; ears rather long.

Color.—Black, the woolly underfur very dark brown; muzzle dark brown in type specimen (old female), but light brown, almost yellowish brown, in half-grown cub.

Measurements (type specimen).—Total length, 1,290; tail, 66; hind foot, 210.

Remarks.—I have not seen an adult male from Coahuila, but if the animal inhabiting the Davis Mountains, Texas, is the same, the old female has a remarkable skull, the nose strongly pugged, the frontals rising abruptly much higher than in *amblyceps.*

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW COYOTE FROM SOUTHERN MEXICO.

BY C. HART MERRIAM.

Among the specimens recently collected by E. A. Goldman in southern Chiapas, near the boundary of Guatemala, is an undescribed species of Coyote. It is much larger than any heretofore discovered in Mexico and may be known from the following description :

Canis goldmani sp. nov.

Type from San Vicente, Chiapas, Mexico, near Guatemala border. No. 133,204. Adult female. U. S. National Museum, Biological Survey Collection. April 25, 1904. E. A. Goldman. Original No. 16,725.

Characters.—Size large—largest of the Mexican species, larger than *lestes* and equal to *latrans* except that the rostrum is not so long.

Color.—Muzzle, top of head, ears, and legs fulvous; face grizzled grayish fulvous; some black hairs in ears; back grizzled buffy gray and fulvous; underfur pale fulvous, much paler than in *vigilis* or *cagottis*.

Cranial characters.—Muzzle rather broad; postorbital processes strongly developed; frontals deeply sulcate; bullæ very large, larger than in any known species; very broad and flattened on outer side; teeth large, those of female about as large as in male *cagottis*, except lower carnassial, which is decidedly smaller than in *cagottis*.

Measurements (of type, adult female).—Total length, 1,220; tail vertebræ, 355; hind foot, 216.

VOL. XVII, PP. 159-160 OCTOBER 6, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SEA OTTER FROM SOUTHERN CALIFORNIA.

BY C. HART MERRIAM.

The Biological Survey has recently secured from Geo. M. McGuire, of Santa Barbara, the skeleton of an adult male sea otter killed July 2, 1904, on San Miguel Island, the most westerly of the Santa Barbara or Channel Islands, California. Sea otters were formerly abundant on these islands, but are now exceedingly rare and believed to be rapidly approaching extinction.

Comparison of the skull of this specimen with a series of skulls from Bering Sea (the type locality of *lutris*) shows the California animal to be a well-marked subspecies. It may be known from the following description:

Latax lutris nereis subsp. nov.

Type from San Miguel Island, Santa Barbara Islands, California. No. 133,508. Adult male. U. S. National Museum, Biological Survey Collection. July 2, 1904. Geo. M. McGuire.

Cranial characters.—Skull large, broad, and high, with long and high sagittal crest and swollen braincase. Compared with *lutris* the following differences appear: Skull as a whole less flattened, braincase more swollen and rounded, the sides (viewed from above), more convex and swollen, especially behind the constriction; anterior part of zygomata more broadly and squarely expanded; basioccipital forming an angle with basisphenoid; coronoid processes sloping strongly backward; sagittal crest much higher and more decurved posteriorly; inner cusp of large upper premolar ($\underline{\text{pm } 3}$) elongated along anterior part of inner lobe (instead of conical) and showing a tendency to subdivide into two parts; 1st lower molar broader and more broadly truncate posteriorly.

The specimen in the flesh measured 6 feet in length.

VOL. XVII, PP. 161-162 DECEMBER 27, 1904

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF THREE NEW SPECIES OF AMERICAN CRABS.

BY MARY J. RATHBUN.

A number of crabs were lent some years ago to the U. S. National Museum by the Zoological Museum at Copenhagen, for the author's use in a monograph of American Brachyura. As the completion of this publication is indefinitely postponed, the new species, the types of which are in the Museum at Copenhagen, are briefly described here.

Uca œrstedi sp. nov.

Type.—Male, from a lot of 2 males, 1 female, from Punta Arenas, Costa Rica; Mr. Œrsted, collector.

Surface uneven; a deep groove on outer side of gastric and cardiac regions is continued anteriorly in a transverse groove behind orbits, and posteriorly toward postero-lateral angle; a second longitudinal groove outside the first divides branchial regions unequally.

Front at base one-sixth as wide as distance between antero-lateral angles, gradually narrowing to a broadly rounded extremity. Antero-lateral angle little more than a right-angle; anterior third of side margin directed backward and a little outward; the margin then turns abruptly inward at an oblique angle and terminates above insertion of second pair of legs.

Larger palm coarsely tuberculate outside; inside an oblique ridge runs from lower margin to a point above middle, then turns at a prominent right angle toward supero-distal end of palm, where it joins the proximal of the two ridges parallel to base of dactylus.

Length of type, 12; width, 13.3; exorbital width, 12.1 mm.

Distinguished by deeply areolated carapace, strongly angulated side-margins and narrow front from all other species of the broad-fronted group.

Pinnaxodes meinerti sp. nov.

Type.—Male. Valparaiso, Chile; Mr. Kröyer, collector.

Near *P. hirtipes* Heller,* a specimen of which, from Port Otway,† is used for comparison. Carapace of our species wider; segments of legs shorter and broader; abdomen of male tapering from third to seventh segments, sixth not constricted; outer maxilliped of different form, merus joint tapering rapidly to distal end.

Length of type, 6.8; width, 7.9 mm.

Lophopanopeus nicaraguensis sp. nov.

Type.—Male. Realejo, west coast of Nicaragua; Mr. Œrsted, collector.

Carapace crossed by transverse lines of coarse granules,—on front, on epigastric lobes, 2 on each protogastric region, one at widest part of mesogastric region; on posterior branchial area a nearly longitudinal row of very short granulated rugæ which extend to posterior margin.

Front little more than $\frac{1}{4}$ width of carapace, median notch V-shaped, lobes most advanced near the notch, outer angles dentiform.

Antero-lateral teeth 5 (orbital included), thick, upturned, increasing in size from first to fourth. From the second a crest extends to buccal angle; fourth and fifth cristate above.

Chelipeds very unequal. Granules of palm form transverse reticulating lines; tubercles form two rows above, and near wrist tend to make longitudinal rows on outer surface. Fingers of large claw gaping, large basal tooth on dactylus, thumb deflexed.

Superior crest of carpus of legs unevenly granulate.

Length of type, 8.7; width, 13; width of front, 3.5 mm.

The ornamentation of the surface, the prominence of the lateral teeth and the absence of lobes from the carpal crests of the legs, distinguish this species from others on the west coast of America.

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* Reise Novara, Crust., p. 68, pl. VI, fig. 2, 1865.

† Proc. U. S. Nat. Mus., XXI, p. 607, pl. XLIII, figs. 10 and 11, 1898.

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OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW COTTOID FISH FROM BERING SEA.

BY HUGH M. SMITH.

[Contribution from U. S. Bureau of Fisheries.]

The steamer *Albatross*, while en route from Japan to America in 1900, made a series of dredgings on the coast of Kamchatka and about the Aleutian Islands. At one dredging station in Bering Sea, 150 miles north of the Rat Islands, there was obtained, on June 27, at a depth of 270 fathoms, a small sculpin representing a new genus and species.

Thecopterus, new genus of *Cottidæ*.

Similar to *Dasycottus* Bean, but with the dorsal fins connected, the branchial membranes joined to the isthmus, the preopercle with 3 spines, and the head and body destitute of tubercles and cirri.

Body short, compressed, deep, tapering abruptly backward from the large head; mouth moderate, terminal, the jaws equal; a band of villiform teeth in each jaw and a patch of teeth on vomer; three sharp preopercular spines; gill membranes united to isthmus; no slit behind last branchial arch; dorsal fins connected, the anterior incased in a fold of skin from which the tips of the spines project, the posterior dorsal similar to anal, both partly concealed by skin; ventrals small and short, the rays (apparently) I, 2; skin smooth, scaleless, the lateral line prominent and continuous.

From *Malacocottus* Bean, this genus differs in having vomerine teeth, no cutaneous filaments, connected dorsal fins, etc.

Thecopterus aleuticus, new species.

Head large, broad, little depressed, its length somewhat less than half total length and slightly exceeding its greatest depth and breadth; body compressed, abruptly tapering from dorsal origin to caudal peduncle, the depth of which equals three-fifths diameter of eye; greatest depth of body about equal to length of head posterior to snout; head with small asperities but no ridges or tubercles; snout broad, rounded, less than diameter of eye; eye large, one-third length of head; interocular space much less than eye;

mouth of moderate size, jaws about equal, maxillary extending to vertical from anterior margin of pupil, mandible broadly U-shaped with diverging rami; a rather broad band of villiform teeth in each jaw, and a patch of similar teeth on vomer; upper angle of gill-cover rounded and projecting across the lateral line; the three preopercular spines enclosing a small triangular space, the two posterior spines directed backward, the anterior outward; gill-rakers short; gill-membranes narrowly joined to isthmus; a continuous series of conspicuous lateral pores beginning under the first dorsal spine and extending on caudal fin; dorsal rays X + 14, the two parts united by a membrane whose height equals half diameter of eye; anterior dorsal rather high, its length about equal to eye and snout, the spines encased in a smooth dermal sheath from which their tips project; soft dorsal longer and higher than spinous, the anterior rays more or less concealed by skin; anal fin with 11 rays, immediately under the soft dorsal and similar to it; caudal rounded, about half length of head; pectorals large, rounded, of 20 rays, extending beyond origin of anal; ventrals very short, the rays I, 2[*]; anal opening considerably nearer to base of tail than to end of snout.

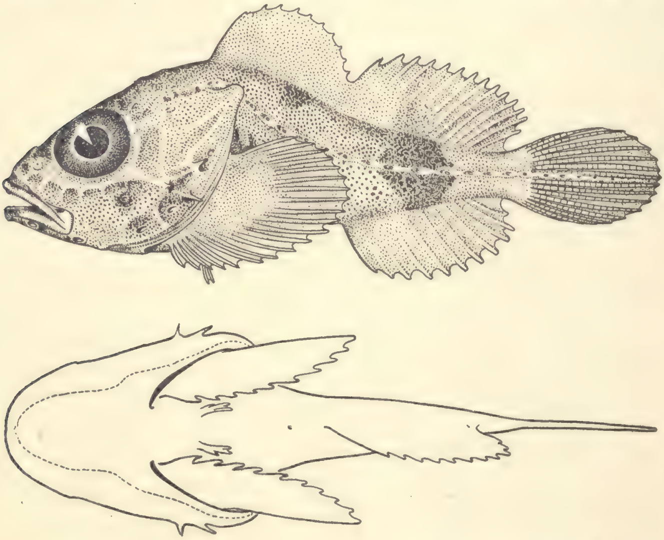

FIG. 1.—*Thecopterus aleuticus* Smith, new genus and species.

Color.—Entire body minutely speckled with black; a broad black band across body between soft dorsal and anal fins, another black band behind axil of pectoral; several small dark areas on head, body, and fins.

Type specimen 40 millimetres long, from *Albatross* station 3785, in Bering Sea 150 miles north of the Rat Islands, at a depth of 270 fathoms.

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[*] Owing to the recent mislaying of the specimen, it is impossible to verify this rather abnormal formula for the ventral rays as determined independently by the author and the artist.

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GENERAL NOTES.

GYROSTACHYS SIMPLEX IN VIRGINIA.

Many years ago I found a large number of plants of this orchid near Fort Myer, Alexandria County, but the station has long been destroyed. On September 28, 1904, I found three plants in a pine wood in Fairfax County above the Great Falls. The above seems to be the first record of this small species for the State and the most southern.—*William Palmer.*

ZOSTEROPS FLAVISSIMA McGREGOR, PREOCCUPIED.

Dr. C. W. Richmond writes me that the above name employed by me for the silver-eye of Cagayancillo Island, P. I., (Bulletin Philippine Museum, No. 4) is preoccupied. Hartert used the same name for a species from Binongka Id., Tukang-Besi group, southeast of Celebes (Novitates Zoologicæ, X, April 20, 1903, p. 29). As the Philippine bird requires a new name, it may be called *Zosterops richmondi.—Richard C. McGregor, Manila, P. I.*

A CORRECTION OF BARROWS' RECORD OF COCCYZUS PUMILUS FROM CONCEPCION DEL URUGUAY.

In the *Auk* for 1884 (Vol. I, p. 28) W. B. Barrows notes the capture of three cuckoos at Concepcion del Uruguay, one on December 11, one on December 30, and the third on January 22, 1880. The first two he refers to *Coccyzus pumilus* Strickland (No. 117 of his list) and the last to *Coccyzus cinereus* Vieillott (No. 119 of his list).

I have lately examined these skins, preserved in the Museum of Comparative Zoology, and find that they all belong to *Coccyzus cinereus.* The December specimens are adults in perfectly characteristic plumage. The January skin is a young bird in a plumage that differs from that of the adult in the same manner that young of other species of *Coccyzus* differ from their parents. In wing and tail measurements it agrees with the adults; the bill, however, is much smaller. The tail has the general indistinctness of marking peculiar to immature examples of *Coccyzus;* the wing feathers are narrowly edged and tipped with rusty; the throat and chest are plain ashy; the lower sides, flanks and under tail coverts are strongly washed with dull tawny-ochraceous. In one rather interesting point this specimen is peculiar — the outer pair of rectrices fall 18 mm. short of the other feathers, giving the tail a more fan-shaped and therefore more normal appearance than in the adult, which has a square tail.

It would have been, perhaps, hardly worth while to make this correction here had not Sclater, on Barrows' record alone, included *Coccyzus pumilus* in his Argentine Ornithology (Vol. II, p. 39), remarking that "the species was only previously known to occur in Venezuela and Colombia." In the Catalogue of Birds in the British Museum, Vol. XIX, 1891, p. 313, Shelley includes in his synonymy, under *Coccyzus pumilus*, a reference to Barrows' record, but does not allow that record to affect the distribution of the species, the habitat of which is given as "The Island of Trinidad,* Venezuela and Columbia."—*Outram Bangs.*

ON A SUPPOSED CONTINENTAL SPECIMEN OF SOLENODON.

There is in the Museum of Comparative Zoloögy a specimen of *Solenodon* that was sent in alcohol (entire and apparently fresh when immersed in the spirits) from the Isthmus of Darien, in 1871, by the late Dr. G. A. Maack. Twenty years later, on the strength of this specimen, Prof. Samuel Garman in his review of Flower and Lydekker's "An Introduction to the Study of Mammals Living and Extinct" † said: "We find *Solenodon* restricted to Cuba and Hayti though also found in Central America." This published statement brought forth for a time no end of comment, and Professor Garman defended himself by saying that there was the specimen and that there could be no question of its genuineness. In time the controversy died a natural death, and even Garman's statement that *Solenodon* occurs in Central America is probably now forgotten. Fearing, however, that one day the question was sure to be mooted again, I took the *Solenodon* out of its jar, skinned it, removed the skull and compared it with all available material. This I did with the utmost care, because if *Solenodon* does still occur on the continent—as does not seem altogether unreasonable in the light of recent discoveries ‡—it surely must be different from either of the island species with which we are familiar.

The specimen in question proved indistinguishable in any way from Cuban examples, but, wishing another opinion than my own, I sent it to Gerrit S. Miller, Jr., who agreed with me that it unquestionably belonged to the Cuban species—*Solenodon cubanus* Peters. In only one way is it at all peculiar—its fore-claws are very long and sharp and obviously had not been used in digging or scratching for insects for some time before its death, at once suggesting its having been kept in confinement.

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* Neither Léotaud nor Chapman give this bird as found in Trinidad, and I therefore doubt its occurrence there. See Chapman, Bull. Am. Mus. of Nat. Hist., Vol. VI, 1894, pp. 10-11, as to numerous birds wrongly attributed to the island.

† *The Nation*, No. 1381, Dec. 17, 1891, p. 477.

‡ The discovery of a Capromys-like rodent in the mountains of Venezuela—*Procapromys geaji* (Pousargues)—is not less astonishing, and much in the same line, as would be the existence of a *Solenodon* on the continent.

The whole matter, therefore, of the continental record of *Solenodon* may be disposed of for good in a few words. The specimen (No. 3223, Mus. Comp. Zool.) is a perfectly characteristic example of the Cuban *Solenodon*; it was sent without comment or special data from the Isthmus of Darien by a reliable naturalist, but it has certain appearances of having been kept in confinement, and in all probability was brought alive from Cuba to Darien, where Dr. Maack secured it either still living or soon after its death. —*Outram Bangs.*

ON THE HABITS OF CAMBARUS UHLERI FAXON.

Cambarus uhleri, described by Faxon from a rather extensive series of specimens sent him by Dr. Philip Uhler, is apparently confined to the portion of Maryland known popularly as the Eastern Shore. According to Dr. Uhler and his collector, his specimens were found in ditches, even in places where the water was decidedly brackish.

Two years ago in Somerset County, and last summer in Dorchester County, I found the species rather abundant in burrows in low-lying areas not far from the bay but always near ponds or ditches of fresh water. In nearly every case the area selected was in dense pine woods.

The burrows were quite similar to those made by *C. diogenes*, and, like that species, *C. uhleri* erects a chimney over the mouth of its burrow. The chimney is usually rather low and can not represent any considerable portion of the earth removed from the hole, for in some cases this extended to a depth of 4 or 5 feet. A single individual invariably occupied a burrow and no communication between burrows was observed. In a lot of about a dozen specimens collected near Crisfield, in September, 1903, both forms of the male are represented; it would therefore appear that the time of ecdysis and transition from form II to form I must be in the late fall. From inquiries I learned that in the spring the animals emerge from their burrows and are common in ditches and small streams. This emergence, like that of *C. diogenes*, is doubtless for the purpose of mating, which having been accomplished, the crayfish returns to a burrow or digs a new one. The color of all the specimens observed was a dirty greenish brown, the tips of the chelæ alone being somewhat reddish. Dr. Uhler, in conversation, has reported that some of his specimens were beautifully marked with spots of golden yellow. Throughout the region mentioned the crayfish is known as the "*lobster*."

C. uhleri is unquestionably an offshoot from the *C. diogenes* stock and has probably reached its rather isolated range from the north. The examination of an extensive series of specimens from localities lying farther to the northward, but still on the Maryland-Virginia Peninsula, would be of great interest and would doubtless throw some light on the post-glacial distribution of our crayfishes.—*W. P. Hay.*

A NEW BOB-WHITE FROM THE UNITED STATES.

The advisability of naming this evident island race is perhaps somewhat doubtful for various obvious reasons, but as the sole existing specimen represents the characters of what I believe to be a strongly marked, small, non-migratory, alar degenerate race, I have decided to describe it. The Key West Bob-white is probably now extinct, though perhaps still rarely to be found.

Through the kindness of Mr. William Brewster I have been able to examine the only specimen as far as I know ever taken on Key West. The specimen was taken by a native and secured by Mr. J. W. Atkins. It is a male, original Scott coll., No. 6,086, Brewster coll., 46,670, taken July 5, 1888. Measurements taken in flesh as follows: lgth., $8\frac{9}{16}$; ext., $13\frac{1}{4}$; wg., $3\frac{13}{16}$ [81]; tar., $1\frac{3}{8}$; [30]; tail, 2 [51]. My measurements taken from skin: wg., 97; tail, 44; tar., 30; bill depth, 11; nost., 9; bill lgth., 14. Mr. Scott records the capture of this specimen and states that Mr. Atkins says that "Quail seem *almost* unknown to the inhabitants of Key West" and that the only additional records he has made there, are "one seen and another heard on May 11, 1888; one seen on May 22, 1888.

In a letter received March 28, 1903, Mr. Atkins writes me that he has not seen any Bob-whites on the island since 1888. The above specimen, he says, was shot out of a covey of four. The remainder were he believes shot by pot-hunters who were "relentlessly pursuing them."

Colinus virginianus insulanus subsp. nov.

KEY WEST BOB-WHITE.

Type: No. 46,670, Coll. of Mr. William Brewster, male taken at Key West, Florida, July 5, 1888. *Geographical Range:* Key West, Florida. *Subspecific Characters:* Crown uniform dark fuscous, forehead showing more white. Otherwise colored like *floridanus*. Size decidedly smaller.

—*Reginald Heber Howe, Jr.*

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SOME CHANGES IN CRUSTACEAN NOMENCLATURE.

BY MARY J. RATHBUN.

There has recently come into my hands, through the kindness of Dr. Charles W. Richmond, a copy of Fridericus Weber's "Nomenclator entomologicus secundum Entomologiam systematicam ill. Fabricii adjectis speciebus recens detectis et varietatibus," published in Kiel ("Chilonii") and Hamburg, 1795. Under the Agonata or Crustacea, pp. 91–96, many of the genera first described in J. C. Fabricius's "Supplementum Entomologiæ Systematicæ" 1798, are enumerated, and as they are accompanied by lists of species most of which were previously known, the genera themselves must date from 1795 instead of 1798. This has already been brought out by Sherborn in his "Index Animalium," 1902.

Both Weber and Fabricius had access to a manuscript by Daldorf, who had made large collections of Crustacea in the Orient and had classified them under a more elaborate system than had yet appeared in print. Daldorf never published his results, and unfortunately his two followers did not make similar use of his manuscript. It follows that the earlier and little known arrangement of Weber must supersede the long accepted one of Fabricius. In the majority of cases the composition of genera is essentially the same by both authors. There are, however, seven notable exceptions:

1. The Linnæan genus *Cancer* is abandoned by Weber, and among its dissevered parts we find the genus *Alpheus* for that group of crabs which three years later Fabricius kept as typical of *Cancer*. *Alpheus* Weber therefore may be considered a synonym of *Cancer*, and, as it is a synonym, it can no longer be employed for the macruran genus which has so long served as the type of the Alpheidæ.

2. The name *Crangon* appears first in Weber attached to the four species of shrimps which were later called *Alpheus* by Fabricius, viz., *avarus*, *tamulus*, *rapax* and *malabaricus;* all but the last were *nomina nuda* at that time, and therefore *malabarica* is the type of *Crangon*. In place of *Crangon* Fabricius 1798, we may use *Crago* Lamarck,[*] type *Crago vulgaris* (= *Cancer crangon* Linnæus).

3. In Weber we find the genus *Homarus*, which is usually attributed to Milne Edwards 1837.[†] As Weber used *Alpheus* to include the typical crabs, abandoning *Cancer* altogether, so he used *Homarus* for the lobster, crayfish, and other typical species of *Astacus* Fabricius 1775 and abandoned *Astacus* altogether. Instead of regarding *Homarus* Weber as a synonym of *Astacus* Fabricius, it is desirable to allow both names to stand each with the type later assigned to it, viz, *Homarus gammarus* (Linnæus)[‡] and *Astacus astacus* (Linnæus).[§] This is in accordance with Canon XXVI of the A. O. U. code, which follows an earlier and similar canon promulgated by the British Association.

4. *Parthenope* Weber 1795 contains six species, *fornicata*, *giraffa*, *longimana*, *regina*, *lar* and *dubia*. Of these the second and last three were *nomina nuda* at that date, leaving *fornicata* and *longimana* the only valid species. *Parthenope* Fabricius has up to this time been limited according to the specification of its type by Leach 1814, as *horrida* Linnæus, a species included by Weber not in *Parthenope* but in a list of doubtful species of *Cancer* listed in his introduction. Strictly speaking, the limitation of *Parthenope* took place at an earlier date than that of Leach. In 1801[‖] Lamarck formed the genus *Maja* by uniting *Inachus* and *Parthenope*, giving the type of the latter group as

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[*] Syst. Anim. sans Vert., 159, 1801.

[†] Hist. Nat. Crust., II, 333, 1837.

[‡] Milne Edwards, Hist. Nat. Crust., II, 333, 1837.

[§] Latreille, Consid. sur les Crust., 422, 1810.

[‖] Syst. Anim. sans Vert, 154, 1801.

the species *longimana* Linnæus, for which in 1815[*] Leach forms the genus *Lambrus*. *Lambrus* therefore is a synonym of *Parthenope* Weber. The species *horrida* hitherto regarded as type of *Parthenope* needs a new generic name,— **Daldorfia.**

Lamarck[†] gives the type of the *Inachus* group as *eriocheles* Lamarck [= *Lithodes maja* (Linnæus)], but as this species is not included by Weber in the original species of *Inachus* it can not serve as the type, which remains as hitherto considered, *I. dorsettensis* (Pennant) 1777 (=*I. scorpio* Fabricius 1781).

A word as to the genus *Maja* Lamarck which was made to include *Inachus* + *Parthenope*. According to that rule of nomenclature, "If a later name be so defined as to be equal in extent to two or more previously published genera, it must be cancelled *in toto*," *Maja* must lapse. *Mamaia* has recently been published by Stebbing[‡] for the species *squinado* formerly considered the type of *Maja*; but the reasons for the change have not yet been published.

5. *Euryala* Weber has one species, *Hippa dentata* Fabricius 1793, which is later[§] made the type of *Corystes* by Latreille. The species should be known as *E. cassivelaunus* (Pennant) 1777. It is worthy of note that in the Kiel Museum there is a dried specimen of this species with the inscription "*Euryale dentata* F."

6. *Idotea* Weber contains two species, *adactila* and *armigera*, new name for *Astacus emeritus* Fabricius. In 1900[||] I showed that the first of these species, *adactyla*, is the type of *Hippa* 1787; and that decision is not altered in the light of earlier but similar removals of the various other species by Weber in 1795. The second species of *Idotea*, *emerita*, is therefore its type, but this species has been reckoned the type of *Emerita* Gronovius 1764 (not 1763) by Benedict,[¶] and if this action be sustained, *Idotea* Weber becomes a synonym of *Emerita*; it is obvious that in any event *Idotea* is not available for a genus of Isopods as defined by Fabricius 1798. The inclusion of *adactyla* and *emeritus* in *Idotea* is referred to by Roux under *Idotea* in "Crustacés de la Méditerranée," 1828, but is there attributed to Daldorf.

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[*] Trans. Linn. Soc. London, XI, 308 and 310, 1815.

[†] Syst. Anim. sans Vert., 154, 1801.

[‡] Spolia Zeylanica, II, pt. V, p. 2, April, 1904.

[§] Hist. Nat. Crust., III, 27, 1802.

[||] Proc. U. S. Nat. Mus., XXII, 301, 1900.

[¶] Bull. U. S. Fish Comm. for 1900, vol. 2, p. 138.

7. *Ligia* Weber has three species, *inflexa*, *3 cuspitata*, and *granaria*; the first two are *nomina nuda*, the last is *Cancer granarius* Herbst, which is the megalopa stage of an undetermined crab. *Ligia* therefore may be considered a synonym of *Cancer;* and the name can not be used for an Isopod.

In consequence of changes in genera, the following names of families of Decapoda must also be changed: Alpheidæ to Crangonidæ, Crangonidæ to Cragonidæ, Corystidæ to Euryalidæ.

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PLANTAE ANDREWSEAE.

BY AVEN NELSON.

It is a source of no little pleasure to find the number of those who are interested in the "wild flowers" constantly increasing. It is an added pleasure when the interest shown is directed to their preservation and propagation, as well as to their collection and study. In Mr. D. M. Andrews, of Boulder, Colorado, Rocky Mountain botany has found an appreciative student who approaches the subject from the practical as well as the theoretical point of view. It is true that Mr. Andrews' work has a commercial side to it since he is engaged (and most successfully) in the introduction of native Colorado plants. But that is merely establishing here a condition for the study of our flora that was practiced elsewhere under less favorable conditions in the pioneer days of western exploration. To understand this we need only recall how many of our best known species were described from plants grown in the English gardens from seeds secured by the earliest collectors. For purposes of study Mr. Andrews' plants are better since, being grown in practically their usual environment, they represent approximately normal development.

I would call attention to the fact that the course Mr. Andrews is pursuing incidentally furnishes the very best evidence of the validity of species. It were well in this day of multiplied species, if we might have many such tests as the following examples illustrate: I had inclined to the view that Dr. Greene's *Lithospermum albicans* was merely a whiter and slenderer form of *L. linerifolium* and I named some specimens in accordance with this view. Mr. Andrews had these species growing in his gardens and knew from their autumnal condition that they were different. To satisfy me he sent me abundant material of each, and I am now growing them in pots side by side. *L. linerifolium* goes into the winter with the next year's leaves well formed and constituting fully developed rosettes on the summits of the short branched crowns of the roots. *L. albicans*, on the other hand, possesses no evergreen leaves and the crowns of the less branched and deeper set roots are wholly naked. To see the two begin their development from their autumnal condition was completely convincing. One more example: The Colorado *Eustoma* we have called *E. Russellianum*. Mr. Andrews, noting that this species was well known as an annual, recalled that the Colorado specimens had not thus impressed him when he collected them. To satisfy himself he visited again the *Eustoma* patch in the mountains. After examining some hundreds of plants he found that not one had failed to develop, as a rosette, the next year's crown leaves. Further evidence that the plant is perennial, were it needed, he finds in the old stems that occasionally persist on the crowns.

Having been kindly permitted to examine some of Mr. Andrews' choice collections I wish to report the following results of my study. Knowing, as I do, the character of his work I account it a privilege to extend to him the recognition that appears in this paper.

All types are deposited in the Rocky Mountain Herbarium.

Asplenium andrewsii sp. nov.

Rootstock short, wholly enveloped in matted roots; stipes naked, ebeneous below, becoming green above, from 2–10 cm. long, somewhat angled or striate; lamina thinly herbaceous, deltoid-ovate or narrower, 3–10 cm. long, somewhat narrower at its widest part, bipinnatifid, diminishing nearly uniformly from base to tip; pinnæ lanceolate, the lower nearly at right angles to the rachis, the upper ascending, gradually diminishing and passing into the pinnatifid tip, all rather closely approximate and subopposite or the lower more distant (1 cm. or more) and alternate; pinnules 3–12 mm. long, ovate, more or less cuneate at base, sharply incised but cut not quite to the costa, sharply and somewhat incisely serrate; the veins rather inconspicuous and but slightly divergent; sori short but nearly connecting to those in the successive lobes, so forming almost a continuous sorus from base to apex of pinnule; indusium straight, forced back and finally concealed by the sporangia.

Perhaps most nearly allied to *A. Bradleyi* D. C. Eaton but probably not very closely even to this. Mr. Andrews writes of it as follows: "The most interesting item on the list to me. I am sending a better specimen. It is certainly indigenous and grows on the south face of a white sandstone (alkaline) cliff extending along Boulder Creek for a mile or more, the ferns growing in crevices abundantly for nearly the whole distance. It is growing with *Cheilanthes Feei*, a specimen of which I send you. The sandstone is porous and is not entirely dry."

Nemexia herbacea melica subsp. nov.

Green and glabrous throughout except for the slight scabrosity on the veins on the lower face of the leaves; leaves broadly ovate, subcordate at base, subulate-apiculate at apex, thin, green above, pale and subglaucous beneath, 6–10 cm. long, 4–8 cm. broad, 7-nerved, the three central nerves larger than the others; petioles slender, 1–3 cm. long; peduncles of the staminate flowers slender, striate, shorter than the subtending leaf, those of the pistillate similar but stouter, also (even at maturity) shorter than the subtending leaf; sepals oblong-linear, about 4 mm. long, longer than the stamens; berry blue-black at maturity, 7–8 mm. in diameter; seeds 3 (in berries examined), large and very hard.

I hesitate to propose this as more than a variety. It is a near relative of *Nemexia* (*Smilax*) *herbacea* and is not readily separated from it by floral or fruit characters. If it becomes a species, *N. melica*, it must be on the following points: (1) Its habit:—Mr. Andrews writes of it as follows: "Strictly erect where it can cling to small trees and bushes, growing straight through and often out at the top, attaining a height of 2–3 m. Growing in the open, as it frequently does after the thickets have been cleared away, it twists about and becomes tangled." (2) Its very thin membraneous leaves. (3) Its actually and relatively shorter peduncles. (4) The large size of its sterile flowers. (5) The remarkably slender tendrils. (6) The sweet or honey-scented flowers in contrast to the carrion-like odor of the other. It furthermore is a good geographical species. True *N. herbacea*, widely distributed as it is, does not occur very near to the middle Rocky Mountains.

I take as type Mr. Andrews' specimens from Boulder Canon,—fruit in 1903, flowers (staminate and pistillate) in 1904. Dr. Francis Ranaley's No. 695, from the same locality, is the same.

Crataegus coloradensis sp. nov.

Leaves 4–5 cm. long, mostly broadly oval to orbicular in outline, sometimes a little narrower, or the upper half broadly triangular-acute; the base rounded or somewhat cuneate, entire or minutely serrate; the upper half incisely and coarsely toothed with finer serrations on the teeth which are slightly calloused but not glandular, scatteringly ciliate-pubescent above, nearly glabrous beneath except on the midrib and primary veins which are noticeably ciliate-pubescent or hirsute, even at maturity; nearly full size when the flowers open; petioles moderately stout, short, rarely more than one-fourth or one-third as long as the blade; bark of the branches gray, irregularly furrowed and checked, with few rather large lenticels; the stoutish twigs glossy-brown (some of the young foliar twigs slender and green); thorns rather few, often nearly wanting on some branches, glossy brown, very variable as to length (3–5 cm.), straight or slightly decurved; corymb many flowered (10–20) broad or flat-topped, the pedicels hirsute-pubescent, rather slender, 1–3 cm. long; calyx tube very short, hirsute, its narrow lobes cut into long slender nearly cylindrical gland-tipped teeth; petals orbicular, about 8 mm. in diameter, crenately toothed; stamens 10, about 5 mm. long; styles stout, mostly three, rarely 2 or 4; the mature fruit large, 10–13 mm. in diameter, dark scarlet-red, tipped with the persistent calyx-lobes and filaments, the pulp juicy and well flavored, the 2–4 (mostly 3) nutlets rather large, slightly ridged on the back.

Mr. Andrews writes as follows of this species: " Both in flower and in fruit it is the most beautiful of the thorns which are native in this part of Colorado, and will compare favorably, I believe, with any American species. The type locality is Gregory Canon, growing with *Crataegus cerronis.* It is a low well-branched tree but rather more open than other sorts, about 10–12 feet tall, isolated specimens being very well rounded and symmetrical."

I know of no western species to which this is closely allied. What is probably the same thing (flowering specimens) was distributed by Crandall from the foot-hills near Fort Collins, 1898, as *C. coccinea macrantha.* Apparently from the same collection by Crandall is No. 4,151, Horsetooth Gulch, May 28, 1898, distributed by the N. Y. Bot. Gard., unnamed. I have it also from R. T. Young, of Boulder, in 1903, these specimens in blossom and later ones with immature fruit; again from the same collector in 1904, with nearly mature fruit. Mr. Andrews' specimens, flowers and mature fruit, are taken as the type.

Crataegus cerronis A. Nelson.

Crataegus cerronis A. Nels. Bot. Gaz. 34:370.

Since the above was published this species has been collected by L. N. Goodding at Slater, Colo., 1903. Excellent specimens are also at hand from Mr. Andrews. These specimens show some points that had to be omitted from the original description, viz.: fruit black, mostly less than 1 cm. in diameter, the amount of pulp small; carpels usually dissimilar, some of them being laterally flattened.

Eustoma andrewsii sp. nov.

Perennial from short vertical semifleshy roots with a somewhat enlarged crown or caudex; the old stems occasionally persisting but apparently usually separating from the crown by an articulation; stems simple below, more or less fasciculately branched above, 2–4 dm. high; leaves from elliptic-oblong below to lanceolate and acute above, mostly 3-nerved, 2–4 cm. long; the next year's crown leaves appearing in the autumn as rosettes which are persistent and evergreen; peduncles ebracteate, 3–8 cm. long; calyx deeply cleft, less than half as long as the corolla, the slender acuminations of its lobes being two-thirds of its length; corolla a deep purple, 3–4 cm. long, its tube nearly one-third of its length, its lobes elliptic-obovate; stamens short, the filaments rather thick, anthers sagittate, erect; style stoutish, scarcely longer than the ovary and shorter than the mature capsule.

My attention was recently called to this beautiful species by Mr. Andrews, who pointed out some of the essential distinctions between this and *E. Russellianum* (L.) Griseb. Its perennial character he tested in the field. "Of several hundred plants not one had failed to produce the rosette of leaves or buds for the next year's growth." Attention may also be called to the smaller deep-purple corolla and the absence of peduncular bracts.

Secured near Boulder, Colo., 1904. I have the same from Mr. C. S. Crandall, "Meadow at LaPorte, altitude 5,500 ft., Aug. 21, 1895."

Pleurogyne fontana sp. nov.

Glabrous throughout; stems slender, simple or with a few narrower erect branches, 1–4 dm. high; leaves linear, mostly narrowly so, thin with distinct midrib and two faint lateral nerves, 20–25 mm. long, the lowest soon deciduous and never rosulate; flowers in a narrow somewhat panicled raceme, having long, very slender pedicels, pentamerous; bracts foliar; sepals green, linear, resembling the bracts but shorter, usually 3-nerved as are also the bracts; corolla often surpassed by the sepals, its lobes elliptic-oblong, sub-acute, about 5-nerved; stamens half as long as the corolla-lobes; the anthers oblong; mature capsule translucent, numerously ovuled, ultimately as long as the sepals.

It has been customary to call the *Pleurogyne* of the Rocky Mountains *P. rotata.* This, I think, is not justified. That species seems to skirt the northern boundary of the continent, from Labrador and Greenland to Alaska. I can find no mention of it in the Rocky Mountains. Rydberg makes no mention of it in the Flora of Montana nor Howell in his Flora of the Northwest. Macoun gives it the distribution in the British Provinces previously indicated by Gray. There seems to be no good reason for the statement "and south in the Rocky Mountains to Colorado." The Colorado species which has passed as *P. rotata* and which here characterized under the name *P. fontana* seems to be closely circumscribed, being probably confined to north central Colorado and the adjacent border of Wyoming.

Differing in many minor points the most obvious difference is the different arrangement of the leaves, *P. fontana* being relatively naked below while in *P. rotata* the leaves are crowded or even rosulate at base.

P. fontana occurs infrequently in wet or springy grassy places in the mountains. Collections at hand: J. H. Cowen, South Park, Colo., Aug. 18, 1895; D. M. Andrews, Boulder Co. (wet meadow, 8,000 ft.), Colo., Sept. (?), 1904; A. Nelson, Crow Creek, Aug. 27, 1903 (Type).

Mimulus minor sp. nov.

Perennial by slender creeping rootstocks, more or less stoloniferous (the stolons short, leafy, slender and occasionally rooting in the mud); stems slender, simple or sparingly branched above, nodes variable in length (usually much longer than the leaves), only 1 or 2 dm. high; leaves 2–5 pairs, enlarging upwards, short-petioled or nearly sessile, ovate, 3–5 nerved, the largest rarely 2 cm. long, sparsely toothed; flowers 1–several, umbellately terminal on very slender pedicels which are 1–3 cm. long; calyx campanulate, about 1 cm. long, somewhat oblique, its teeth unequal and obtuse or subacute; corolla yellow, more or less purple dotted in the throat, about twice as long as the calyx, bilabiate, the dense yellow beard on the lower lip extending down the tube nearly to the insertion of the stamens; the upper lip lighly ciliate-hirsute along the veins.

The yellow species of *Mimulus* as is well known are extremely variable. The knowledge of this fact has lead to carelessness in determination and a "lumping" of species that does not seem to be conducive to clearness. The species here described has, in recent years, passed as a depauperate *M. Langsdorfii* Sims. This latter species is one of the largest, often attaining a height of one meter. Its stems are large and fistulous; its inflorescence racemiform, at length greatly elongated and often with a succession of racemes from the leaf axils. The flowers are large and much more than twice as long as the calyx. Its lower leaves are rather long-petioled, coarsely toothed or often somewhat lyrate; the uppermost are always connate-perfoliate and the largest leaves are always well toward the base of the stem. In fruit the teeth of the lower lip of the calyx are connivent tending to close the orifice. *M. minor* like *M. Langsdorfii* is either glabrous or puberulent, but the pubescence of the corolla in *M. minor* extends to the veins of the upper lip, and its calyx remains open.

The following specimens are at hand, all from Colorado: D. M. Andrews, 8, near Boulder, 1904 (Type); K. K. McKenzie, 352, Breckenridge, 1901; Rydberg and Vreeland, 5,658, Placer Gulch, 1900; W. W. Willard, 1,926, Twin Lake, 1898; H. N. Wheeler, 312 and 372, near Boulder, 1901; Baker, Earle and Tracy, 181, Bob Creek, 1898; Baker, 392, Gunnison Watershed, 1902.

Erigeron macranthus mirus subsp. nov.

Leaves few, thick, glabrous, pale beneath; root-leaves 4–6 cm. long, elliptic, their petioles as long or longer than the blades, margined and expanding below to a somewhat sheathing base; stem leaves 3–5 cm. long, sessile and, like the root-leaves, elliptic and mostly obtuse; the uppermost ovate, acute; heads few, the rays very numerous (more than 100) long and very narrow; the involucre and peduncles brownish-purple, glabrous but under a lens seen to be covered with a close beady glandulosity.

This may be specifically distinct but the distinguishing characters are not readily stated. Its aspect is such as would not at once suggest *E. macranthus.* Its two or three large handsome heads, the relatively short and few coriaceous leaves and the dark peduncles and involucres with their glistening beady surface (under a good lens) suggests to one a plant as strange as it is handsome.

Secured on a partially shaded mountain slope, Boulder County, by Mr. Andrews, 1904.

Aster andrewsii sp. nov.

Forming patches or colonies of considerable extent by means of the creeping underground rootstocks; stems nearly erect, rather slender, nearly or quite simple, minutely granular-glandular, becoming glandular or viscid-pubescent above, brownish and more or less tinged with purple, expecially above, 2–4 dm. high; leaves rather numerous, broadly linear, acute at apex and slightly tapered at both ends, 3–5 dm. long, about 5 mm. broad, the uppermost somewhat reduced, indistinctly 3-nerved, ciliate on the margins, both faces sprinkled with minute nearly sessile glands; heads usually solitary-terminal, occasionally one or two greatly reduced and possibly always aborted heads appear in the uppermost axils; involucre low-hemispherical, about 15 mm. broad, half as high; bracts in about 3 only moderately unequal rows, linear-lanceolate, somewhat acuminate, the glandulosity like that of the stem; rays 20–30, a beautiful dark azure blue, linear-oblong, about 15 mm. long and 2 mm. wide; pappus a sordid white, the short akenes pubescent.

No closely allied species is known to the writer. The type by Mr. Andrews is from an open valley at about 9,500 ft. altitude, near Eldora, Boulder County.

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